FRENCH TANKS OF WORLD WAR II (2)

Cavalry Tanks and AFVs

STEVEN J. ZALOGA

ILLUSTRATED BY IAN PALMER

NEW VANGUARD 213

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FRENCH TANKS OF WORLD WAR II (2)

CAVALRY TANKS AND AFVS

EARLY EFFORTS AT CAVALRY MECHANIZATION

As was the case elsewhere in Western Europe, World War I was the swansong of traditional French horse cavalry. The cavalry continued to exist in the French army, but in a very diminished and distorted form. A number of cavalry divisions were still present in the order of battle, but they fought on foot and differed little from the ordinary infantry. After the war, the French army still saw a potential use for horse cavalry to conduct reconnaissance, flank security and liaison operations, but largely as a servant of the infantry. The idea of the cavalry as the mobile arm of decision on the battlefield was in serious doubt. A secondary reason for the retention of the cavalry was their value in the colonies, especially in North Africa and the Levant where they still had their utility.

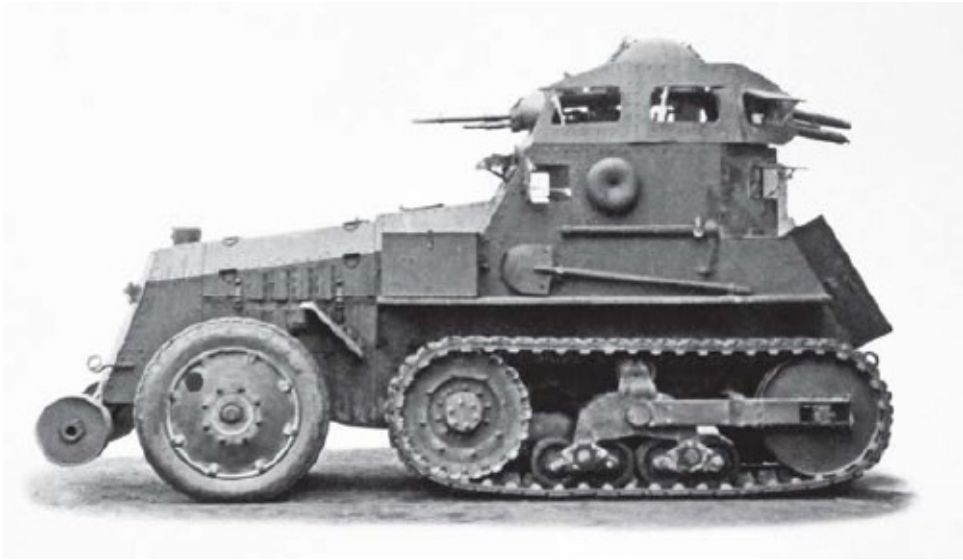
The cavalry had dabbled in mechanization as early as 1902 in the form of armored cars. They were generally designated as automitrailleuses (AM: machine-gun cars) or auto canons (AC: gun cars) depending on their armament. They saw combat use in the mobile opening phase of the war, but became increasingly irrelevant with the stagnation of trench warfare. Early armored cars were based on conventional automobile chassis, and they were overburdened with armor, underpowered, and susceptible to becoming bogged down off the road. There was a brief flurry of use in the final year of the war with the arrival of improved designs and greater opportunities for mobile missions.

To their credit, senior French commanders saw cavalry as focused on a

mission rather than defined by the horse. The most influential cavalry officer of the interwar period, Gén Maxime Weygand, wrote an influential article in the very first postwar issue of the *Revue de Cavaleri*e in 1921. He argued that

> trench warfare is the negation of war, since war always seeks a decision which can only be produced through movement ...The cavalry will keep its raison d'être as long as speed and surprise are valued on the battlefield ...The war of tomorrow will be, more than ever, a war of machines.

The more far-sighted cavalry leaders saw the *esprit cavalier* tied to mobility rather than to the horse. The French cavalry continued to develop the armored car, but recognized from the outset that it was road-bound. The standard practice was to form mixed scouting groups of armored cars and motorcycles, with the motorcycles used for cross-country scouting.



In the late 1920s, the French cavalry hoped that the half-track technology embodied in the Citroën-Kégresse system would overcome the mobility problems of traditional armored cars. The most numerous type built was the AMC Schneider P16, which was manufactured in 1930–31. (MHI)

At the beginning of the 1930s, the cavalry's armored force in metropolitan France consisted of 11 squadrons of White TBC armored cars left over from World War I. Of the 230 armored cars still on hand, about half were modernized between 1931 and 1933 by rebuilding them on Laffly truck chassis with 50hp engines. These were called AMD Laffly 50 AM or "White-Laffly."

The problem facing the French cavalry in the 1920s was the lack of funding and the weakness of the technology. Tanks were a possible solution, but they were too slow and the postwar reorganization put them under infantry control. In spite of this, the French cavalry units experimented with the use of mixed

tank/armored car raiding groups. Renault FT tanks were carried piggyback on heavy trucks for speed and the tanks were disembarked when needed for combat missions. The moto-mobile groups of the early 1920s were an interesting precursor of the later mechanized divisions.

The Schneider P 16 remained in service through the 1940 campaign, although its role diminished as fully tracked cavalry tanks began to appear. This example is seen on duty with the 2e GAM during summer war games in the 1930s. (NARA)

The AMC Citroën P 28 was an attempt to convert a failed infantry tractor into a cavalry armored car. Although 50 were ordered in 1931, they proved to be a technical flop and they were retired prior to the 1940 campaign. (NARA)

The panacea for the French cavalry in the 1920s was the half-track. This technology seemed to offer essential cross-country capability as well as superior speed to contemporary tanks. Most of the early experimental work focused on the Citroën-Kégresse system. Adolphe Kégresse was born in France but emigrated to Russia in 1905, where he worked in the imperial auto park of the tsar. He developed a half-track system using rubberband tracks to improve the mobility of the tsar's limousines while on hunting expeditions in the Russian countryside. In the wake of the Russian revolution, he returned to France in 1919 and was hired by Citroën to adopt this suspension system to both commercial and military vehicles. Following a disastrous expedition in Algeria in 1920, when most of the 32 vehicles in a convoy into the Sahara were lost, Gén Jean-Baptiste Estienne proposed using Citroën-Kégresse half-tracks. A convoy of five vehicles crossed the Sahara and reached Timbuktu in the winter of 1922–23. This led to several other expeditions around the globe that highlighted the remarkable cross-country value of the Citroën-Kégresse system.

In light of the publicity attending the use of the Citroën-Kégresse system, there were a number of experimental half-track AFVs built between 1922 and 1925. The only one to reach series production was the Citroën P4T. It had a rear-mounted turret with a 37mm gun, and 14 were built. Some were sent to cavalry units in the Levant, but it proved to be too weakly powered. The more robust AMC (automitrailleuse de cavalerie) P16 was developed by 1928. This used an improved Citroën-Kégresse suspension and a more powerful Panhard 60hp engine, providing a sustained road speed of 30km/h (18mph) though it could be pushed to 47km/h (29mph) for short periods. The first four pilots were assembled by Schneider on Citroën chassis starting in 1928. After some refinements, the French cavalry placed an order for 96 vehicles in 1930, with deliveries complete by 1931.

In the meantime, Citroën proposed its own half-track AMC. This was based on its experimental infantry resupply vehicle Type N, a losing competitor to the Renault UE. The resulting AMC Citroën P28 was an attractive design with a center-mounted turret. The cavalry ordered 50 in October 1931. However, they proved to be an extreme disappointment in all respects. A total of 44 remained in French cavalry service for instruction, and three were exported to Uruguay. The half-track AMC proved to be a technological dead end for the French cavalry. As Gén Weygand noted during the September 1932 war games, "the AMC that were

conceived of a decade ago are obsolete from the moment they leave the factory." Although they offered better cross-country mobility than the old White armored cars, they were far from satisfactory.

THE WEYGAND REFORMS

Gén Maxime Weygand became head of the general staff in January 1930 and vice president of the Superior Council of War through January 1935. His July 1930 reform plan envisioned the motorization of several infantry divisions and a complete overhaul of the cavalry. Weygand saw the need to return the cavalry to its role as the decisive arm of maneuver on the battlefield, and felt that the only way to accomplish this was through mechanization. He received significant support from within the cavalry itself, including influential officers such as Gén Jean Flavigny, Directeur de la Cavalerie from 1931 to 1936. Others, such as cavalry inspector general Gén Charles Brecard, were more skeptical due to the costs and technological risks. The existing experiments with the half-track armored cars and dragon-portées (motorized dragoons) carried on half-track trucks had proven encouraging, but existing vehicles were not especially robust during prolonged war games. In the event, the cavalry began by mechanizing one brigade in four of the new light cavalry divisions and began completely mechanizing a single cavalry division in 1933. The onset of the Great Depression severely undermined any more extensive effort until late in the decade.

In spite of their shortcomings, conventional armored cars built on truck chassis continued to be built in the 1930s. In 1935, the army workshops at Vincennes assembled 28 AMD Laffly-Vincennes 80 AM on a White-Laffly

truck chassis, armed in this case with a Hotchkiss 13mm heavy machine gun. They were completely inferior to the new Panhard AMD 35 and so were shipped off to colonial duty in North Africa. This example served with the 4e Escadron, 4e RCA in Tunisia, and was seen here during the celebration of the liberation of Tunis on May 20, 1943. (NARA)

The Weygand reforms envisioned the use of three types of cavalry armored vehicles, all dubbed armored cars (automitrailleuse) to avoid stepping on the toes of the infantry, who were still nominally in charge of tanks. The automitrailleuse de découverte (AMD) was intended for the traditional cavalry role of deep reconnaissance along the main roads. This designation was usually applied to traditional wheeled or half-track armored cars. The automitrailleuse de réconnaissance (AMR) was intended to provide close reconnaissance for the dragon-portées regiments. This type of vehicle eventually emerged as a light tank armed with machine guns. The automitrailleuse de combat (AMC) was the primary fighting vehicle of the cavalry, sufficiently armed to engage enemy tanks. The first AMC was the Schneider P16 half-track, but future plans envisioned it as a fast medium tank. On paper, the revised 1932 cavalry division was expected to include a régiment des automitrailleuses (RAM) which would have four squadrons (escadrons) with a total of 15 AMD, 15 AMR and 30 AMC.

Renault AMR 33

Although the half-track AMR had proven more satisfactory than wheeled armored cars, they had marginal cross-country country performance. The decision by the cavalry in 1931 to purchase 50 AMR P28 from the rival Citroën automotive firm prompted Louis Renault to use company funds to develop a full-track rival to the Citroën-Kégresse half-tracks. The Renault VM was a very small, two-man tank about the size of the older Renault FT. A major objective of the Renault effort was for higher road speeds than possible with the old Renault FT, based on the use of the new narrow-pitch tracks inspired by the British Carden-Loyd tankette. The armament was quite puny, only a single machine gun, since the vehicle was intended for reconnaissance. To keep the size small, the engine was mounted asymmetrically in the fighting compartment on the right side. A total of five pilots were built with different suspensions to examine the technical value of each. The first pilot was sent to the CEAM commission in Vincennes in the summer of 1932 for trials, followed by the other pilots as they were ready. In December 1932, the commission reported that the Renault VM satisfied the AMR requirement. On March 8, 1933, Renault was awarded a contract for 45 tanks as the AMR Renault Modèle 1933, usually abbreviated as AMR 33. The first was delivered on June 1, 1934, and subsequent contracts

brought the total to 118 serial production tanks by the time production was completed in 1935. Two pilots were rebuilt, so a total production of 120 AMR 33 is often cited.

The Renault VM was accepted for service in 1933 as the first cavalry light scout tank, better known as the AMR 33. Here several of the tanks of the 3e GAM are seen during one of the 1938 parades in Paris. (NARA)

Renault AMR 35

Although the cavalry found the new Renault AMR 33 to be a significant improvement in mobility and speed over the old half-tracks, the small size and cramped interior caused problems. In a discussion with Gén Flavigny in 1934, Renault was told that there had been complaints from AMR 33 test crews, who became quite fatigued on missions of 150km due to the noise and vibrations of the side-mounted engine. Flavigny indicated that a more conventional rear-mounted engine was desirable. The resulting Renault ZT returned to a more conventional layout with the engine mounted in the rear. The larger hull permitted a larger turret that could accomodate more powerful weapons. A pilot was delivered to Vincennes for trials in April 1934. The commission concluded that the ZT was a definite improvement over the earlier AMR 33, and in view of the ominous political developments in Germany, recommended a contract extension for a further 100 tanks. These were designated as the AMR Renault Modèle 1935, usually abbreviated as AMR 35.

Deliveries of the AMR 35 began in April 1936. There were two standard turret configurations for the vehicles, Tourelle Avis No. 1 armed with the 7.5mm machine gun and Avis No. 2 armed with the Hotchkiss 13.2mm heavy machine gun. A third variant, the ADF 1 voiture de commandant d’escadron (squadron

commander’s vehicle), had a modified turret with a large loop antenna fitted along with a pair of command radios. Two additional contracts followed in 1936, bringing the total to 200 AMR 33 of all variants. The original type with machine-gun armament was subsequently called the ZT 1, and through the end of 1938 when production ended a total of 167 AMR 35 ZT 1 (87 7.5mm and 81 13.2mm) was built. Production of the ADF 1 squadron command vehicle totaled 13.

The Renault AMR 33 was never very popular in service due to the location of the engine in the right half of the fighting compartment. This created substantial noise and vibration for the crew. As can be seen in this rear view of an AMR 33 on parade in Paris, the radiator was located in the right rear corner of the hull. (NARA)

The AMR 35 cavalry reconnaissance tank was built in two standard configurations, and this is the type with the Avis No. 1 turret with 7.5mm machine gun. This particular tank served as a command vehicle with the 2e Bataillon, 4e RDP of the 1e DLM and was lost during an attack near Mont

St Éloi on May 22, 1940 against the 7.Panzer-Division. It was fitted with an ER 29 mle. 1939 radio in an armored bin on the right fender, although this is not very apparent since the antenna was dismounted during the fighting. The white rectangle and blue diamond on the right fender was a standard French army recognition sign for cavalry units. (NARA)

During the course of production, the cavalry expressed interest in a version armed with the new 25mm antitank gun that could be used by the reconnaissance groups attached to infantry divisions (GRDI: groupe de reconnaissance de division d'infanterie). A version with the APX 5 turret was developed as the Renault ZT 2, and a turretless version with the gun in a casemate mounting was developed as the ZT 3. Due to delays in the manufacture of the APX 5 turret, deliveries of the Renault ZT 2 did not begin until 1939. Ten of each type were built, rounding out the production contract of the 200 AMR 35. Curiously enough, a specialized version, the AMR 35 ZT 4 was in development in 1940 as a type colonies for use in Indochina to replace the old Renault FT tanks. These had better ventilation and cooling in the hull for use in tropical conditions. A total of 55 were on order in 1940, the first 18 of which were to be armed with the existing Renault FT turret and the remainder with the Avis turrets. Only three hulls were completed prior to the fall of France.

Besides the basic Renault AMR 35, there was also some army interest in specialist command vehicles based on the chassis. A requirement had been established in 1931 for a voiture de commandement et de liaisons blindées type M (VCLB: armored command and liaison vehicle). Renault offered its original type YS for this requirement in September 1933, based on the AMR 33 chassis but with a large fixed superstructure. This was satisfactory enough that a contract was awarded in April 1934 for ten of the vehicles. Due to delays, the ten serial production Renault YS were built on the newer AMR 35 chassis. These were completed in the spring of 1938 as Renault YS voiture de commandement, with four going to the cavalry, two to the mechanized infantry in the armored divisions, two to infantry tank units, and two to the artillery for experimentation. In contrast to the AMR 35 tank, the Renault YS had the engine moved into the front of the hull to provide more space in the rear. An enlarged superstructure was fitted in the rear to accommodate up to six troops, including the command staff and radio operators. The artillery branch wanted a more elaborate voiture blindée tous terrains d'observation d'artillerie (all-terrain artillery observation vehicle). Renault offered the YS 2, which was based on the existing YS design, but fitted with a cast turret incorporating an optical rangefinder. A single pilot was deployed with artillery regiment of the 2e DLM (division légère mécanique) prior to the Battle of France, but it never entered series production.

The less common of the two AMR 35 configurations was fitted with the larger Avis No. 2 turret armed with a 13mm Hotchkiss heavy machine gun. This particular vehicle was photographed in Paris in 1937 and served at the time with the 3e GAM. (Pierre Touzin)

The Renault YR was the basis for a family of turretless command tanks based on the AMR 35 series. This is the first production vehicle, and shows how the engine was moved to the front of the vehicle to make room in the rear for a six-man crew. (Patton Museum)

The AMR 33 and AMR 35 were the only types of cavalry scout tanks to enter series production before 1940. However, a number of other designs were offered to the cavalry, including the Citroën P 103 light tank and the Gendron-Somua and Berliet VUDB 4 armored cars. The cavalry was never entirely happy with the AMR 35 and wanted more speed for the reconnaissance role. In 1934, Somua displayed the pilot of a new armored car design developed in conjunction with Gendron. After initial trials, a second prototype was delivered in late 1937

and was accepted for production at the outbreak of the war in September 1939 as the AM Gendron-Somua modèle 39. A total of 150 was ordered, with deliveries scheduled to begin in August 1940. Gén Maurice Gamelin opposed the production due to its weak armor, and in the event none were manufactured.

Cavalry Tank: The Renault AMC

Gén Weygand envisioned a more heavily armored and heavily armed AFV as part of the cavalry mechanization scheme, euphemistically called an automitrailleuse de combat to avoid interference from the infantry. The program began in December 1931, and Renault offered its YR tank design, Somua its AC half-track and Fromajet/Batignolles its wheeled tank design. The Renault YR was essentially an upscaled VM with the engine mounted in the rear. A soft steel pilot was sent to Reims in September 1933 for trials, fitted with an APX-1CE turret. This fulfilled the basic requirements for the AMC and was more mature than the other designs. Since the AMC was intended to be capable of fighting enemy tanks, the definitive APX 2 turret with 25mm gun was developed separately. Curiously enough, this was the first of the new turrets being developed by APX in the early 1930s to accommodate a two-man crew. Due to the growing crisis with Germany and the need to rapidly equip the first of the new mechanized cavalry divisions, Renault received a production contract for 12 AMC 34 vehicles in March 1934. The AMC 34 tanks were delivered starting in October 1935, but without turrets. Some were temporarily fitted with Renault FT turrets, and in the event, only the last six vehicles were delivered with the APX 2 turret.

The AMR ZT3 was an effort to improve the firepower of the cavalry reconnaissance squadrons by arming the AMR 35 with the standard 25mm antitank gun in a casemate. Surcouf served in the EMC (escadron des mitrailleuses et canons) of the 7e GRDI in 1940 and was abandoned after

suffering a mechanical breakdown. It is shown here in German hands after the campaign. (Patton Museum)

The ACG 1 was Renault's attempt to create a satisfactory cavalry tank. Although 50 were ordered for the French cavalry, they were kept in depot until the desperate days of June 1940 when they were issued to autonomous companies. (Patton Museum)

By the time that the AMC 34 had arrived, they had already fallen behind in technology. The suspension was based on the older AMR 33 (Renault VM) while the AMR 35 (Renault ZT) used a new and more robust suspension. In addition, the 20mm armor was recognized as insufficient once the German army began adopting the 37mm antitank gun, and likewise the 25mm gun was felt to be inferior to newer options. As a result, Renault substantially reconfigured the design as the ACG 1 autocanon de cavalerie (ACC: cavalry assault gun) with heavier armor and the 47mm SA35 gun. Two pilots were delivered in March 1936 and a contract was awarded for 48 tanks, which were delivered from November 1938 to February 1940. Of these, one was reconfigured as the ACG 2 armed with a hull-mounted 75mm gun as used in the Char B tank family. This vehicle was never finished.

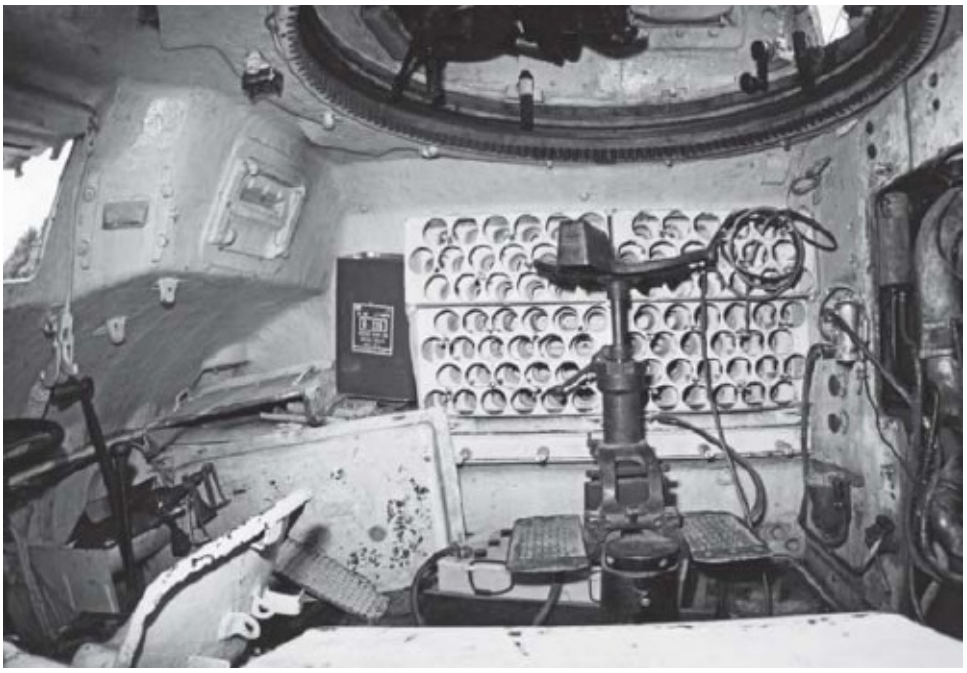
Production of the AMC 35 Renault ACG 1 was very limited, as by this time the cavalry had settled on the much larger and more powerful Somua S35 for its AMC requirement. Indeed, the ACG 1 was not issued to any cavalry units until the final weeks of the 1940 campaign, when it was used to form improvised units. Besides the production for the French Army, the Belgian army selected this design and ordered 25 tanks. This project was heavily criticized in Belgium, where the deployment of such powerful tanks was viewed in some corners as a provocation against Germany and a threat to Belgian neutrality. In the event, a

single prototype was delivered, followed by ten series production tanks fitted with the slightly different AMX 2B turret armed with a Belgian 47mm gun.

The ACG 1 is more famous for its use by the Belgian army in 1940. The 11 Belgian tanks used the slightly different APX2 B turret, which was fitted with a Belgian 47mm gun. This is tank 803 (registration number 2191), commanded by Maréchal-deslogis Verboven. It was knocked out on the night of May 21, 1940 near Kwatrecht by 37mm antitank gun hits on the turret and glacis plate while supporting a Belgian infantry counterattack. (NARA)

Cavalry Tank: The Somua S35

Somua's original AC half-track proposal for the AMC requirement reached the prototype stage in 1933, but there was little cavalry interest in the design due to the recognition that the fully tracked Renault YR offered better cross-country performance. The cavalry was unwilling to write off Somua's potential contributions to the mechanization effort, since there was some concern that Renault's Billancourt plant was overwhelmed with infantry orders including the UE infantry tractor, the R35 light tank and the B1 battle tank. Somua was encouraged to offer a tank design for the AMC requirement and submitted a design in October 1934. The suspension design was undertaken by Eugène Brillié, a Schneider engineer who had designed the first French tank, the Schneider CA1. Curiously enough, Brillié had also been involved in the design of the suspension of a tank being developed at the time by another Schneider subsidiary, the Škoda LT vz. 35 in Czechoslovakia, perhaps better known by its later German designation, PzKpfw 35(t). The similarity between the Somua and PzKpfw 35(t) suspension is not widely appreciated, since the Somua suspension was hidden under a metal cowling.



An interior view of a preserved Somua S35 from the left access hatch, showing the interior of the fighting compartment. The driver's station can be seen to the left and the commander's elevating seat in the center. The right wall of the fighting compartment was dominated by a large stowage bin for the 47mm ammunition. (Author)

The AC 3 pilot was delivered in April 1935, minus the turret, which was under development by APX. The Somua AC 3 made extensive use of large armor castings for its hull and had an armor basis of 40mm, which was judged sufficient to withstand the new German 37mm antitank gun at typical combat ranges. As a result, the prototype was overweight, 17 tonnes versus the specified 13 tonnes. Although the Vincennes commission was quite pleased with the tank's cross-country performance, there were numerous mechanical shortcomings with the engine and other features. After modifications were made, trials resumed between October and December 1935. A second pilot tank was delivered with a temporary mounting for an APX 1 turret. Tests on this version were conducted from July 1936 to March 1937, which revealed the need for a new engine, wider tracks, and better hull ventilation.

A

1: RENAULT AMR 33, 3e GROUPE D'AUTOMITRAILLEUSES, PARIS 1938
The initial batches of the AMR 35 with the Avis No. 1 turret were painted in the simple fashion seen on Renault products in 1935 and 1936, with a simple pattern of yellow ochre over army olive green. The 3e GAM insignia was usually painted on the turret sides as seen here, but other tactical markings were minimal at this time.

2: RENAULT AMR 35, 6e ESCADRON, 1ere RDP, 2e DLM, DUNKIRK, JUNE 1940

This AMR 35 with the Avis No. 2 turret comes from the flamboyant period of Renault camouflage painting, with a band of pale pastel yellow (jaunâtre) besides the usual army green, grey and sepia brown. Aside from the white tactical number on the turret rear, no other markings are visible on the side. The 6e Escadron AMR of the 2e Bataillon, 1ere RDP had its own tactical insignia of a diamond bisected in red and blue that was usually carried on the forward side of the hull. It is not evident on this particular tank. The insignia of the 2e DLM, the usual cavalry blue diamond but surmounted by a white Cross of Lorraine, was usually carried on the hull front on the right side transmission access bulge.

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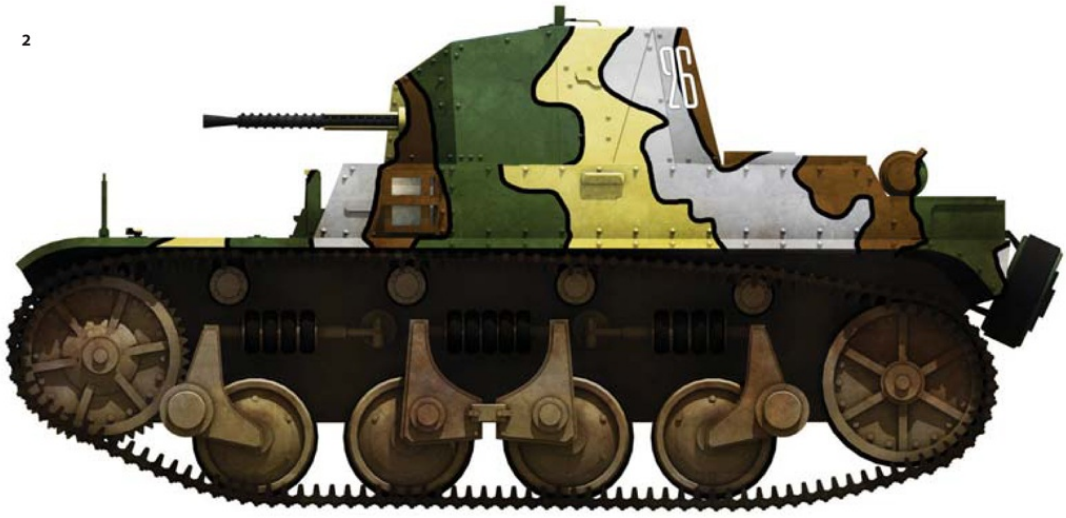
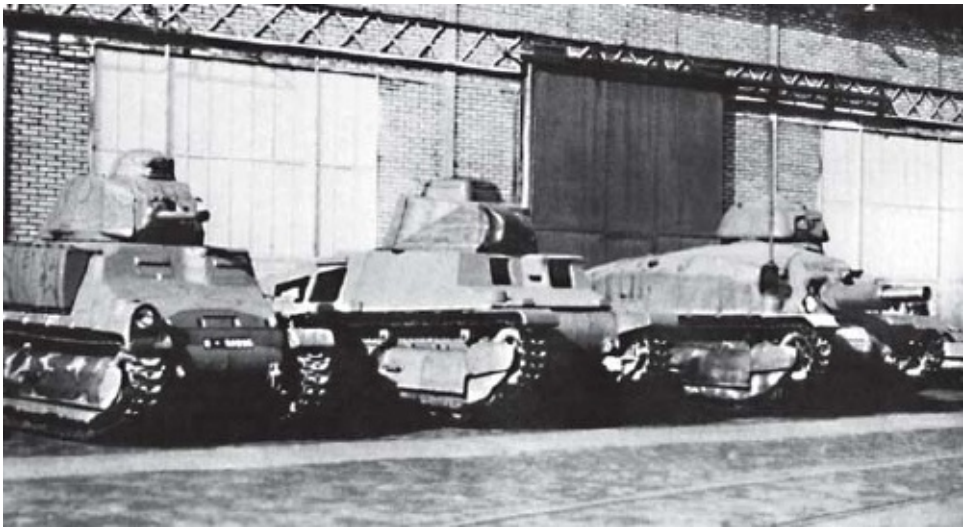


The final prototypes of the S35 design were fitted with the APX 1 turret until the definitive APX 1CE became available. (Patton Museum)

The Somua design had proved so promising that an initial production contract for 50 was awarded in March 1936 for the definitive AC 4 design as the Char de Cavalerie 1935 S, more often known as the Somua S35. Four preproduction tanks were delivered in the summer of 1937 to ensure that the upgrades were adequate. These still had the old APX 1 turret. The definitive production tanks were fitted with the new APX 1CE turret, the CE indicating *chemin elargi* (enlarged turret ring). This turret was very similar in overall appearance to the APX 4 turret used on the Char B1 bis, but it had a wider turret ring. The intention was to permit the use of a “one-and-a-half man” turret crew. The tank commander sat inside the turret, but the turret ring was wide enough that the radio operator in the hull could stand up on the right side and assist the commander in loading the gun. The Somua S35 was designed from the outset for a radio transceiver. However, shortages of radios generally limited the use to platoon commanders, roughly one in five tanks.

As a show of strength at a time of international crisis, the new Somua S35 was first displayed to the public during the National Day parade in Paris on July 1938. At this stage, the tanks were not yet complete, and lacked the armored visors for the driver. These tanks belonged to the 13e Dragons of the 2e DLM, and this is the regimental commander's tank, with both radio aerials in place. (NARA)



Several variants of the Somua S35 were under development in 1940. To the left is a standard production S35, in the center a prototype of the new S40 with its ARL turret and welded hull. On the right is the SAu40 assault gun armed with the APX 75mm gun, a private venture by the Somua factory and intended as a French equivalent of the German StuG III. (Patton Museum)

Even after the various technical problems on the pilots had been solved, the manufacturing process proved troublesome. The casting of large armored

components was still very technologically advanced in 1937, and led to continual delays in deliveries and orders. At the start of the war in September 1939, the cavalry had ordered 500 S35 tanks, of which 270 had been completed by Somua, 248 delivered to the army, and 191 deployed with cavalry units. By June 1, 1940, a total of 417 Somua S35 of the 600 on order had been delivered, though many had not been issued to cavalry units and the more recent deliveries were still without turret or armament.

A Hotchkiss H35 of the 2e Escadron, 18e Dragons, 1e DLM during a parade in Paris before the war. The H35 can be distinguished from the later H39 by the more steeply angled engine deck and the forward pointing exhaust pipe. (APGOM)

A parade of Hotchkiss H35 from the 3e Escadron, 2e GAM on Place Kleber in Strasbourg on November 23, 1938, celebrating the 20th anniversary of the return of French troops to the city. (NARA)

The difficulties with manufacturing sufficient tanks due to the bottleneck of the casting foundries led to a substantial redesign effort, substituting steel plate for castings. The new ARL 2C welded turret was armed with the same 47mm gun as the production tank. A pilot with a wooden turret mock-up was completed by April 1940, and there were hopes that the resulting S40 might be ready to replace the existing S35 on the production lines by July 1940. A production contract for the first 50 S40 tanks was awarded on September 21, 1939. The plan was to fit the usual APX 1 CE turret to the first 80 tanks, and then to switch to the ARL 2C turret. The pilot was never completed though there were some attempts to revive the production after the armistice, as mentioned below.

The Accidental Cavalry Tank: The Hotchkiss H35

Although the Hotchkiss H35 light tank was rejected during the competition for the new infantry tank, trials of the prototypes continued at Vincennes. In the summer of 1935, the new war minister, Jean Fabry, and chief of the general staff, Gén Gamelin, saw one of the Hotchkiss tanks take part in trials at the obstacle course at Vincennes alongside one of the early Somua S35 prototypes. The Somua at this stage was very unimpressive, lacking its turret, and its automotive performance was uninspiring. In contrast, the small Hotchkiss proceeded through the course with little difficulty. Fabry became a strong proponent of the Hotchkiss, and insisted to Gamelin that it proceed to production in place of the

Somua. Fabry was largely unaware of the technical characteristics of the Somua, particularly its thicker armor, better gun, and three-man crew. Gen Flavigny, the father of the new cavalry light mechanized divisions and a strong proponent of the Somua, attempted to discourage production of the Hotchkiss. The cavalry did not like the Hotchkiss since its 37mm gun was not suitable for cavalry tactical doctrine, which considered tank fighting part of its mission. Nor was the one-man turret attractive; the cavalry was shifting to two-man turrets on the AMR, AMC and AMD. The infantry did not want any Hotchkiss models due to the various technical faults uncovered during the previous trials. Gamelin eventually succumbed to political pressure from Fabry, and authorized an initial contract for 200 tanks that was awarded on November 6, 1935. Since the infantry adamantly opposed the type, he directed them to the cavalry on the grounds that it would provide an interim capability for the new DLM until the Somua became available.

B

1: SOMUA S35, 1e ESCADRON, 2e CUIRASSIERS, 3e DLM, BELGIUM 1940
This tank (matricule 10697) follows the coloring style of the initial batch of S35s, which had horizontal bands of army green and earth brown with a band of light blue-gray on top. The S35 tanks were in the regiment's first two squadrons so were numbered around 50–73; this was carried on the side and repeated on the left rear turret panel. The regiment sometimes used the emblem of the "Sun King," Louis XIV, on the hull side, based on the regimental insignia. The national cocarde was carried on the turret cupola, turret right rear panel, and centrally on the hull rear upper casting.

2: SOMUA S35, 3e ESCADRON, 18e DRAGONS, 1ere DLM, BELGIUM 1940
The final camouflage scheme on the S35 was this pattern of vertical bands of army green, medium green, and earth brown, separated by thin black edging. The unit insignia, the hippogriffe, is carried inside the squadron symbol, in this case a diamond. The national cocarde was painted on the hull side, turret cupola, and right rear turret rear.

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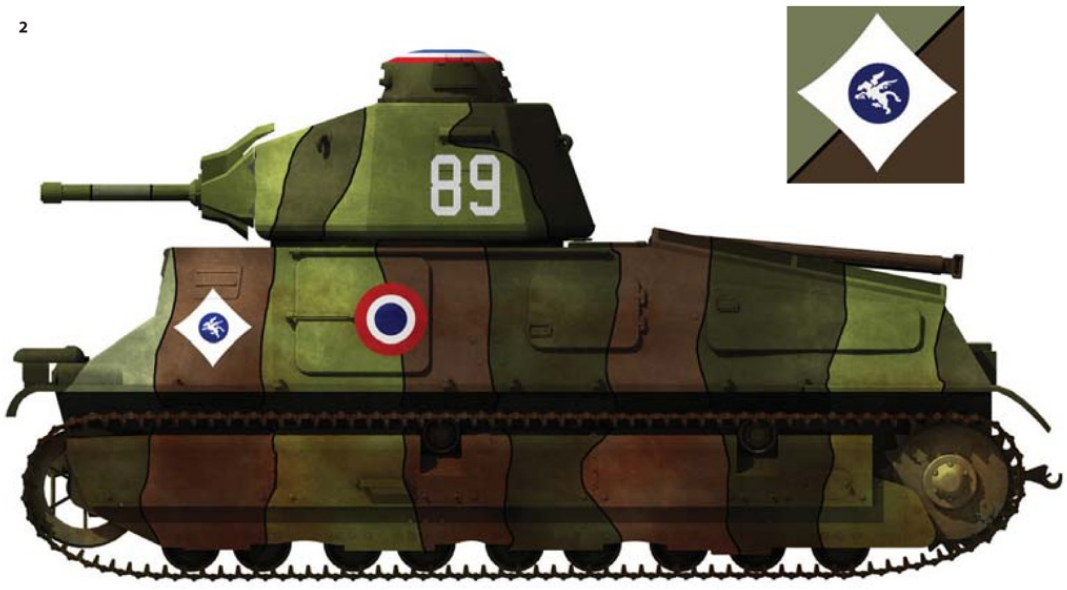
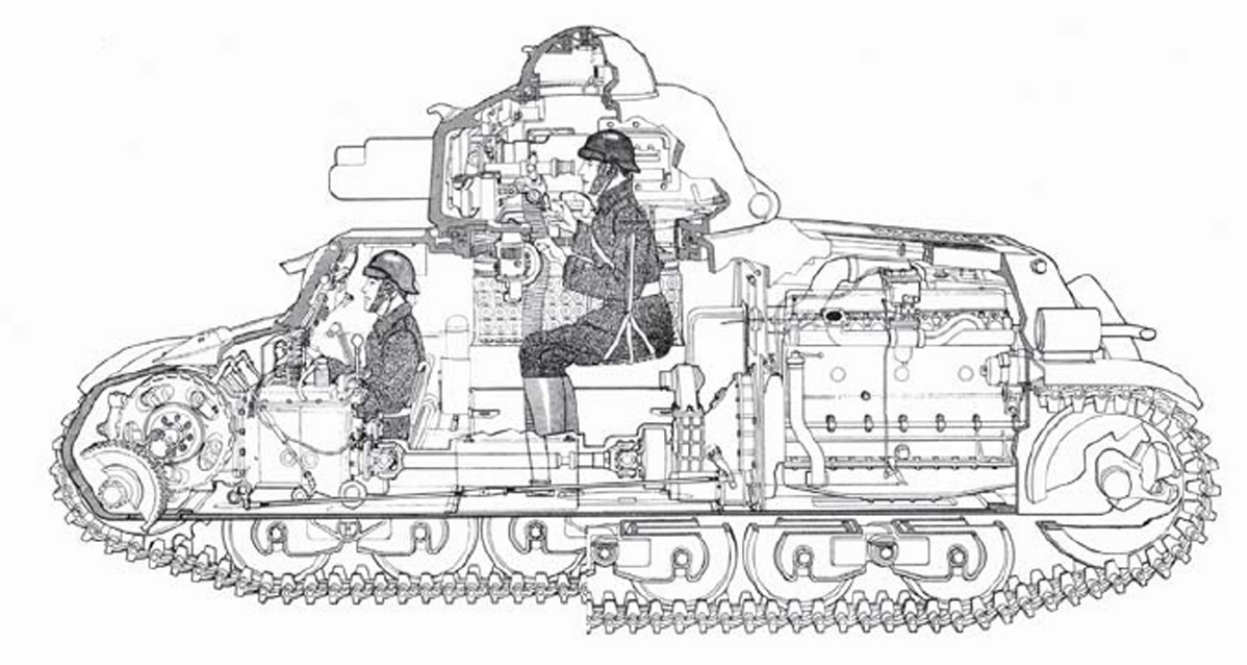


Delivery of the Hotchkiss Char de Cavalerie H35 proved slower than anticipated. The first tanks were delivered in July 1936. By January 1, 1937, a total of 157 had been delivered by the St Denis plant, but in reality they were still awaiting turrets from the government APX depot. A second contract for a further hundred tanks was awarded on September 7, 1936, with delivery from July to November 1937. Once again, actual deliveries to cavalry units were delayed by the need to complete the tanks with government-furnished components such as the turret, vision devices and weapons. At the start of the war in September 1939, all 300 cavalry H35 had been delivered, of which 232 were in units, 16 were on overseas assignments, 44 were still in depots and 8 were being used for trials or other assignments. In spite of Flavigny's unhappiness over the selection of the Hotchkiss H35, its availability before the arrival of the Somua S35 did help the cavalry to mechanize faster. The 1e DLM was equipped in the early part of 1938 and the 2e DLM by the summer.



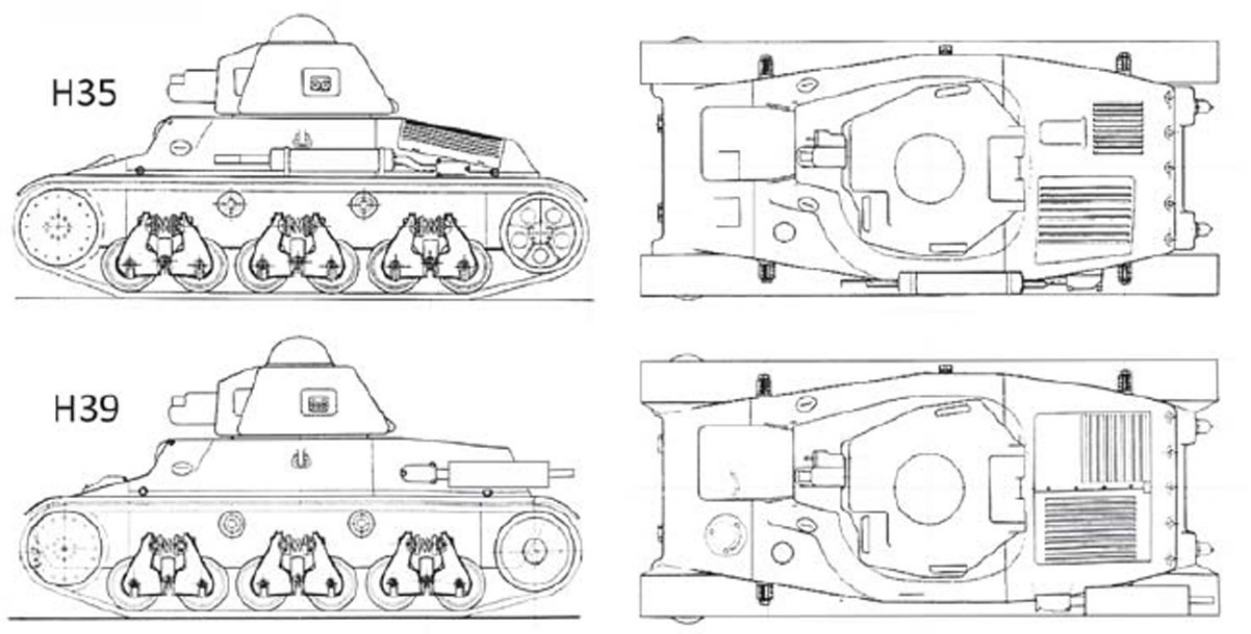
An illustration by the manufacturer showing the interior layout of the Hotchkiss H39.

The initial production run of the H39 was armed with the same 37mm SA18 gun as the H35, but used the improved turret with PPLRX-180 P episcopes. This tank, “Le Léopard,” served with the 1e Cuirassiers of the 3e DLM, and was knocked out after taking several hits during one of the large tank battles in the Gembloux Gap in Belgium during the second week of May 1940. (NARA)

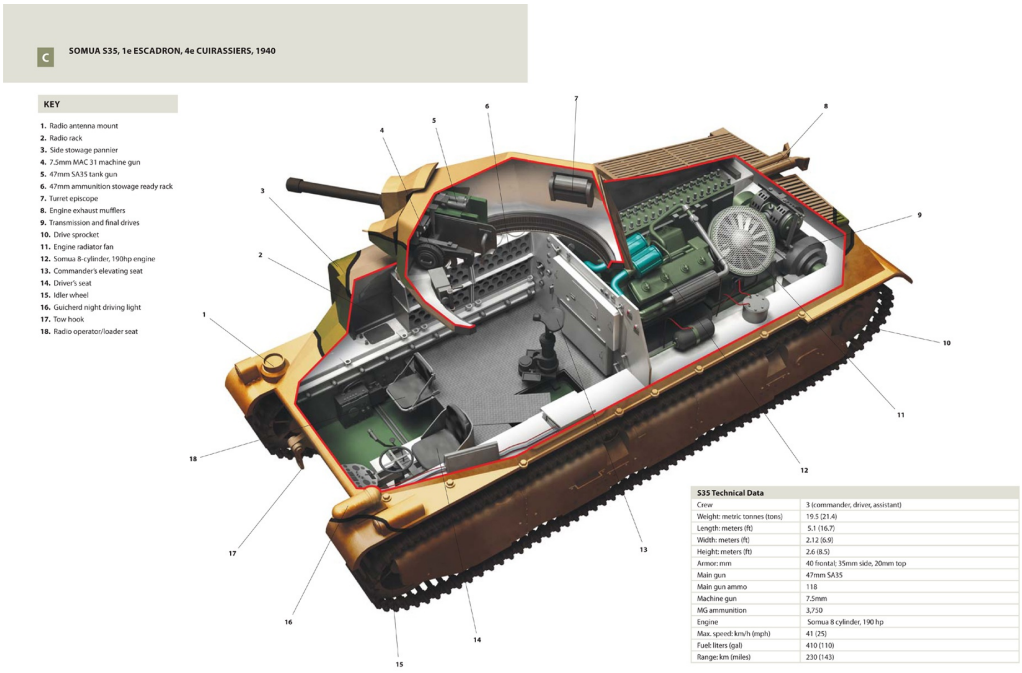
Expedient Tank: The Hotchkiss H39

Neither the infantry nor cavalry wanted the H35, and its service use did little to convince them otherwise. The French army found that the tank was sluggish and that the transmission was ill-suited to steering. In spite of its technical shortcomings, the Hotchkiss plant continued to receive orders from the army due to political pressure from the government and some factions within the army. The controller general of the army, Robert Jacornet, was supportive of further contracts because the Hotchkiss plant at St Denis was not operating at full capacity at a time when tank deliveries from other plants, including Renault, were running badly behind schedule. Hotchkiss attempted to ameliorate the design with a thorough modernization effort that culminated in the H39 in 1938. This version substituted a more powerful 120hp engine along with an associated enlargement of the rear hull casting. This increased maximum speed from 28km/h (17mph) to 36km/h (23mph), but reduced the range from 150 to 120km (93–75m). The H35 suspension was prone to losing the rubber from its road wheels, so the modified suspension used steel-rimmed wheels. To accommodate the added weight, the tracks were widened from 25 to 27cm. Hotchkiss referred

to the new version as Char Léger mle. 1938 series D, sometimes abbreviated as 38H. This designation was not adopted by the army, which called it the Char Léger mle 1935 H modifié 1939 or H39. An initial contract for 400 H39 tanks was awarded in July 1938 with about half going to the cavalry. The first batch of H39 tanks was delivered in February 1939, though without guns or armament. At the start of the war in September 1939, no H39s had been delivered to the cavalry. A total of 680 H39s had been delivered by the end of May 1940 and 703 had been completed at the factory by June 1, 1940.

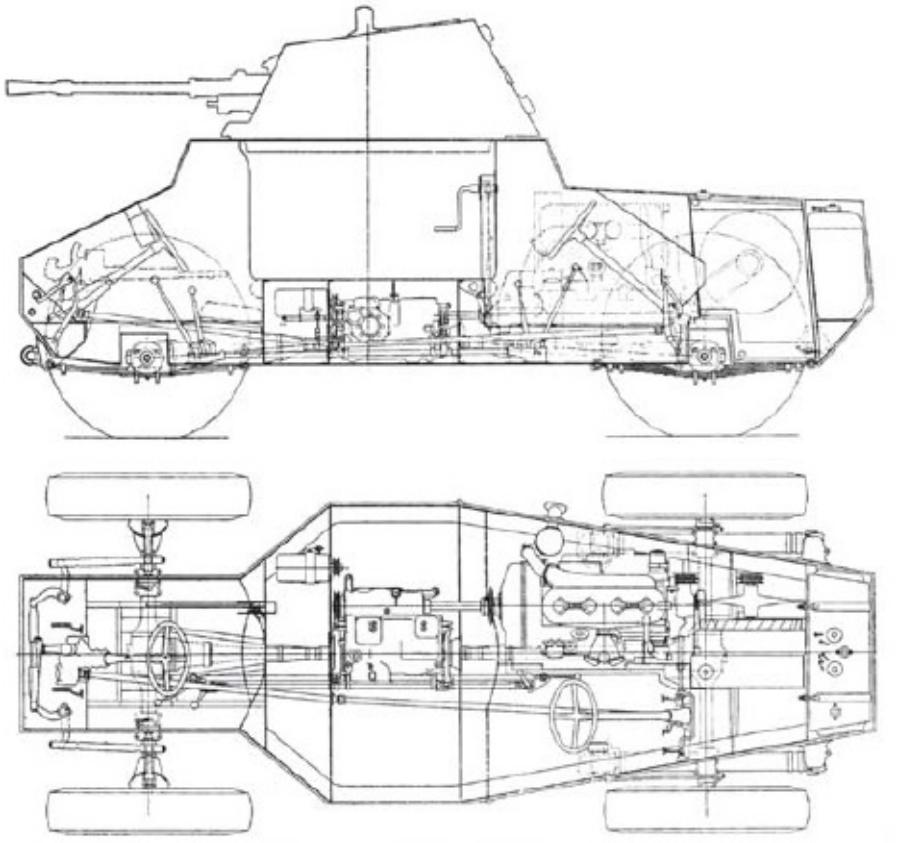


These comparative scale plans from the Hotchkiss operator's manuals show the differences between the H35 and H39, most notably in the engine deck, muffler, and suspension plates.


C
SOMUA S35, 1e ESCADRON, 4e CUIRASSIERS, 1940
KEY
1. Radio antenna mount
2. Radio rack
3. Side stowage pannier
4. 7.5mm MAC 31 machine gun
5. 47mm SA35 tank gun
6. 47mm ammunition stowage ready rack
7. Turret episcope
8. Engine exhaust mufflers
9. Transmission and final drives
10. Drive sprocket
11. Engine radiator fan
12. Somua 8-cylinder, 190hp engine
13. Commander's elevating seat
14. Driver's seat
15. Idler wheel
16. Guicherd night driving light
17. Tow hook
18. Radio operator/loader seat
S35 Technical Data
Crew 3 (commander, driver, assistant)
Weight: metric tonnes (tons) 19.5 (21.4)
Length: meters (ft) 5.1 (16.7)
Width: meters (ft) 2.12 (6.9)
Height: meters (ft) 2.6 (8.5)
Armor: mm 40 frontal; 35mm side, 20mm top
Main gun 47mm SA35
Main gun ammo 118
Machine gun 7.5mm
MG ammunition 3,750
Engine Somua 8-cylinder, 190 hp
Max. speed: km/h (mph) 41 (25)
Fuel: liters (gal) 410 (110)
Range: km (miles) 230 (143)

The 37mm SA18 gun on the Hotchkiss had been based on infantry requirements. The Spanish Civil War had revealed the need for tanks to be able to fight other tanks, and this led to the development of the long 37mm SA38 gun, which entered production at the end of 1939. This was mounted on H39 tanks starting around no. 480. Due to lingering shortages, they were issued on a scale of one long 37mm gun per three cavalry tanks (peleton/platoon commander) and one per every four infantry tanks (section commander). By April 1940, 358 of the new guns had been completed and a total of about 800 were completed by the end of the 1940 campaign. These were mounted primarily on the H39, but some were fitted to the R35 and R40, and a small number were retrofitted to the older H35 in cavalry units. The infantry requested the addition of an unditching tail on the Hotchkiss, and this started to be fitted in March 1940.

Two dozen of the radio version of the Panhard 178 were ordered to serve as regimental command vehicles. They resembled the normal armored car, but lacked the usual armament in favor of additional radio equipment. This particular example, lost in Belgium on May 20, 1940, was the final production vehicle of the series. (NARA)



This interior plan of the Panhard AMD 35 shows how the engine was offset to the right to accommodate a second driver for backward steering. This feature was a fad in European armored cars of the time, the presumption being that reconnaissance vehicles needed to be capable of a fast withdrawal on encountering heavy enemy opposition.

Comparative Technical Data: AMC

	H35	H39	AMC 35	S35
Crew	2	2	3	3
Weight: metric tonnes (tons)	10.6 (11.7)	12.1 (13.3)	15.0 (16.5)	19.5 (21.4)
Length: meters (ft)	4.22 (13.8)	4.22 (13.8 no tail)	4.45 (14.5)	5.1 (16.7)
Width: meters (ft)	1.85 (6.1)	1.95 (6.4)	2.13 (7.0)	2.12 (6.9)
Height: meters (ft)	2.13 (7.0)	2.13 (7.0)	2.2 (7.2)	2.6 (8.5)
Frontal armor: mm	40	40	25	40
Main gun	37mm SA18	37mm SA38	47mm SA35	47mm SA35
Main gun ammo	100	100	95	118
Machine gun	7.5mm	7.5mm	7.5mm	7.5mm
Engine (hp)	75	120	180	190
Road speed: km/h (mph)	28 (17.3)	36.5 (22.7)	42 (26)	41 (25)
Fuel: liters (gal)	180 (48)	207 (55)	300 (80)	410 (110)
Range: km (miles)	130 (80)	120 (75)	125 (78)	230 (143)

Eyes of the Cavalry: The Panhard AMD 35

At the outset of the war in September 1939, the cavalry had 344 armored cars deployed in its units in France. More than a third of these were old types, including 29 of the vintage AMD White TBC, 43 of the rebuilt AMD Laffly 50, and 74 of the half-track AMC Schneider-Kégresse. The most important cavalry armored car was the Panhard AMD 35, which became the standard type by the start of the fighting in May 1940.

A Panhard AMD 35 has been preserved at the Saumur tank museum and is seen here at the annual Satory exhibition in the 1990s. (Author)

A requirement for a new armored car suitable for deep scouting was approved on December 22, 1931 on the basis of the Weygand reform plans, and the details were modified in December 1932. Four firms competed, offering the Renault VZ, the Berliet VUB, the Panhard 178 and the Latil AMD. The Panhard et Levassor design was a break from previous French armored car designs, which built the vehicle around an existing truck chassis with a front-mounted engine. The Panhard Voiture spéciale 178 had a fully armored body with integral chassis and a rear-mounted Panhard SK 105hp engine. In its prototype form, it was armed with a Hotchkiss 13mm heavy machine gun in a turret developed at Vincennes. By the time of its production, the APX 3 turret had been developed at the government arsenal and it was armed with a version of the 25mm antitank gun, the SA35. The pilots were fitted with a small track under the center of the chassis to assist in unditching the vehicle in deep mud. However, this feature was complex and not very useful, so it was dropped. The crew consisted of four: a driver, a two-man turret crew, and an *inverseur.* The Panhard had dual driving controls to permit it to be steered backward, and the *inverseur* was seated in the rear of the vehicle in the event that the vehicle had to be driven in reverse. The Panhard 178, like most cavalry vehicles, was designed to accommodate a radio, usually the ER.26 ter that was located in the hull on the left side near the gunner. The Panhard utilized riveted construction of the armor plate, with 20mm frontal

armor and 9–13mm side and top armor.

D

1: HOTCHKISS H35, 3e ESCADRON AMC, 2e GAM, 2e DIVISION CAVALERIE, 1939
The prewar cavalry tank squadrons were often colorfully marked. The base finish of this tank is the usual early Hotchkiss scheme of ochre blotches edged in black on a base army green finish. The cavalry regiments typically used the traditional playing card symbols, with the color indicating the squadron and the shape indicating the troop (peleton): spade (1er); heart (2e); diamond (3e), club (4e). Tactical numbers were lower than in the regiments. Unit crests were often painted on the tanks, frequently on the tactical symbol. The turret cupola has been painted with the national cocarde.

2: HOTCHKISS H35, 3e ESCADRON, 18e DRAGONS, 1er DLM, BELGIUM 1940
The first production batch of Hotchkiss H35 delivered to the cavalry was typically finished in a scheme of army green with blotches of yellow ochre (ocre jaune) with a black edging. A variety of markings were added to the unit's tanks in 1939–40, including a cocarde (roundel) on the rear turret hatch and white tactical numbers. Since this was the second regiment of the brigade, the tactical numbers of the tanks were over 46, usually 50–99. The regimental insignia, the legendary hippogriffe, is carried on a shield rather than a playing card symbol, since this was a command tank. This tank has had several improvements since original delivery, including replacement of the turret visors and the addition of a radio and its associate armored box on the front left fender.

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Trials of the Panhard 178 were undertaken at Vincennes starting in January 1934. The trials proceeded satisfactorily and the design proved to be robust. The commission recommended adopting the Panhard over its competitors on February 15, 1934, though with a variety of small changes. Testing continued, including an arduous set of trials in Morocco in 1936. The first production contract for 30 vehicles was awarded on February 1, 1935 under the designation Automitrailleuse de Découverte Panhard Modèle 1935, usually abbreviated as AMD 35. In cavalry service, the Panhard was nicknamed the Pan-Pan. The first vehicles were scheduled for delivery starting in January 1936, but the plant became caught up in the labor unrest that roiled the country in the spring of 1936. As a result, the first vehicles were delivered in February 1937. At the time of the outbreak of the war in September 1939, 217 had been delivered, rising to 370 by May 10, 1940. A total of 543 of all types were manufactured by the time of the armistice, 52 unfinished due to a lack of turrets.

There were several variants of the AMD 35. The Voiture Blindée PC pour ER 27 was a radio command vehicle fitted with the ER 27 radio station. The turret lacked the usual 25mm gun and radio masts were fitted forward and aft. A total of 24 was ordered in 1937 and 1938 and built in 1939. These were employed by the regimental headquarters section, with one per regiment. They served in the two DLM and three DLC in 1940. A further 150 were ordered in April 1940, though none of these were completed. Two colonial versions of the Panhard were manufactured. The AMD 35 Type Colonies was intended for use in the tropical colonies, especially Indochina. It was a lighter vehicle fitted with the APX 5 turret and had a three-man crew. An initial batch of four vehicles was sent to Indochina in October 1939 and three more without turrets in January 1940. The AMD 35 Type AFN (Afrique française du nord) was another colonial version fitted with a special radiator for operations in hot climates. Although plans were under way to fit it with a heavier gun in the 37mm or 47mm range, the initial production contracts kept the standard APX 3 turret. A total of 128 were ordered for 8 squadrons, but delays in the manufacture of the special radiator delayed the first deliveries until mid-May 1940. By then, it was too late to send them to North Africa. About 80 were completed and were used by cavalry units in the final stages of the 1940 campaign in France. The Voiture Spéciale 207 was a tank-destroyer version of the Panhard, armed with a rear-facing 47mm SA37 antitank gun. This design was never completed. However, during the course of the Battle of France in 1940, a number of AMD 35 hulls were ready but without turrets. Chef d'Escadron Joseph d'Astorg, commanding the 1er RAM of the 1e DLC, asked the Renault factory at Billancourt to produce a welded turret capable of fitting the standard 47mm SA35 tank gun. Under the

direction of Joseph Restany, it was finished in four days and tested on June 5, 1940. It was hastily rushed into service and fought in the 1er RAM along the Loire.

A portion of the H35 fleet was modernized in 1940 with the new 37mm SA38 gun, the improved turret vision devices, and an unditching tail. This tank of the 8e Dragons was lost during the fighting near La Neuville-en-Yourne-à-Fuy on June 11, 1940. (NARA)

A Somua S35 of the 29e Dragons, 2e DLM, knocked out during the fighting in 1940. At least one hit can be seen on the driver's visor plate. The club insignia on the turret identifies it as a tank of the 4e Peleton (platoon). (Patton Museum)

The majority of AMD 35 was deployed in the six squadrons of the régiments

de découverte in the three light mechanized divisions, each with 24 armored cars. A further five squadrons were attached to the régiment d'automitrailleuses (RAM) of the light cavalry divisions, each equipped with 17 vehicles. Seven squadrons, each with 16 vehicles, were attached to the reconnaissance groups of the motorized infantry divisions (GRDI). A single squadron, the 21e Escadron, was raised to support the expeditionary corps in Norway in 1940. Besides these standard units, a number of improvised cavalry units were hastily equipped with the AMD 35 in the May–June 1940 fighting.

In May 1938, the cavalry proposed the amalgamation of the AMD and AMR vehicles into a single vehicle, dubbed the automitrailleuse puissante de cavalerie. Several firms presented concepts, including a Somua half-track design. The most promising was the futuristic Panhard 201 design, which was based on a conventional 4x4 configuration, but with two additional sets of steel wheels in between the main wheels to assist in extricating the vehicle if it became bogged down. The prototype underwent tests through April 1940. The armament was not fully developed, but an oscillating turret was in development, armed with the 37mm SA38 gun. Production of 600 Panhard AM 40P was ordered on May 1, 1940, with production expected to begin in the spring of 1941. In the event, none were manufactured. The prototype was evacuated to Morocco in 1940 and formed the basis for the postwar Panhard EBR armored car.

Comparative Technical Data: AMR and AMD

	AMR 33	AMR 35	P16	AMD 35
Crew	2	2	3	4
Configuration	tracked	tracked	half-track	wheeled
Weight: metric tonnes (tons)	5.0 (5.5)	6.5 (7.1)	6.3 (6.9)	8.2 (9.0)
Length: meters (ft)	3.5 (11.5)	3.84 (12.6)	4.8 (15.7)	4.8 (15.7)
Width: meters (ft)	1.6 (5.2)	1.64 (5.4)	1.75 (5.7)	2.01 (6.6)
Height: meters (ft)	1.78 (5.8)	1.88 (6.2)	2.47 (8.1)	2.31 (7.6)
Frontal armor: mm	13	13	11	20
Main gun	7.5mm MAC 31	13.2mm Mle 1930	37mm SA18	25mm SA35
Main gun ammo	2,250	1,220	100	150
Machine gun	spare 7.5mm	spare 7.5mm	7.5mm	7.5mm
Engine (hp)	85	82	50	105
Max. speed: km/h (mph)	60 (37)	55 (34)	47 (29)	72 (45)
Fuel: liters (gal)	128 (34)	130 (34)	125 (33)	140 (37)
Range: km (miles)	200 (124)	200 (124)	250 (155)	300 (186)

Cavalry Mechanization

Gén. Weygand's reforms between 1930 and 1935 started the process of cavalry mechanization. During the 1930s, the core of the French cavalry consisted of several cavalry divisions. Aside from their four horse cavalry regiments, these divisions had an armored car group (GAM: groupe d'automitrailleuses) and a mechanized dragoon battalion (BDP: bataillon de dragons portés). In February 1940, the three remaining divisions were reorganized as light cavalry divisions (DLC: division légère de cavalerie), which reduced their horse cavalry element in half to two horse cavalry regiments but expanded the mechanized portion into a light motorized brigade. The previous GAM was reorganized as an armored car regiment (RAM: régiment d'automitrailleuses), which included six instead of the previous three squadrons (escadrons). The squadrons usually consisted of 16 vehicles each, and the types varied but usually included a squadron of Hotchkiss light tanks and a squadron of Panhard AMD 35. The mechanized dragoon force in each division doubled to a regiment of two battalions.

1: HOTCHKISS H39, 1er CUIRASSIERS, 3e DLM, BELGIUM, MAY 1940
The cavalry did not begin to receive its H39 until after the start of the war. Most were finished in the standard late scheme of army green and earth brown, spray-painted in large patterns. The tanks of the 1e Cuirassiers were usually painted with names on either front side. The vehicle tactical numbers, issued in consecutive order, were painted on the turret sides. The 2e Cuirassiers usually repeated the number on the rear turret corners, splitting the number left/right in the case of two-digit numbers.

2: HOTCHKISS H39, 8e DRAGONS, 7e DLM, JUNE 1940
The 8e Regiment des Dragons was originally part of the horse cavalry brigade of the 4e DLC, and it suffered heavy losses during the fighting in Belgium. The remnants of the division were used to form the core of the newly constituted 7e DLM starting on May 24, 1940, equipped with H39 tanks including the latest production version with the 37mm SA38 gun and unditching tail, such as this one. Given its hasty formation, markings were minimal, consisting of the usual two-tone army green/earth brown camouflage, and numerous national cocarde insignia due to the problem of fratricide. This regiment saw heavy fighting in the first two weeks of June, losing nearly all of its more than 40 tanks.

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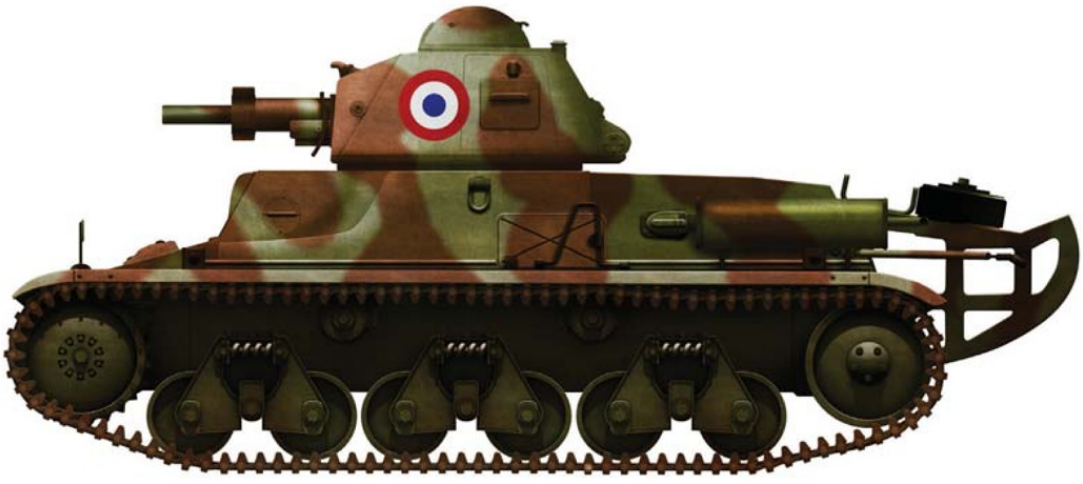


An impressive display of Hotchkiss H39 tanks of the 1er Cuirassiers of the 3e DLM at a widely photographed demonstration for the press during the Phony War in 1940. (NARA)

The centerpiece of the mechanization process was the light mechanized division (DLM: division légère mécanique). The formation of three of these divisions was ordered at the end of 1934, although they did not begin formation until 1935. The 1e DLM was created on July 1, 1935 on the basis of the existing 4e Division de Cavalerie at Reims and Verdun. The 2e DLM was created in the summer of 1936 on the basis of the 5e Division de Cavalerie. The 3e DLM did not begin forming until early 1940. These divisions were intended for the traditional cavalry roles of reconnaissance, flank security for infantry corps, offensive exploitation of breaches in the enemy lines, and defensive responses to enemy breakthroughs. The heart of the division was a pair of brigades. Both were labeled as brigade légère méchanique (BLM) even though they had fundamentally different composition. One of these contained the main tank elements of the division consisting of two régiments de combat. The other brigade consisted of a régiment de decouverte (reconnaissance regiment) based on armored cars and a régiment de dragons portés (RDP: dragoon regiment) of half-track-borne infantry.

Since the Hotchkiss H35 was available first, the régiments de combat were heavily reliant on this type until the newer H39 and S35 became available. As more Somua tanks became available by 1940, S35 squadrons were substituted

for Hotchkiss squadrons for a half-and-half mix in the regiments. The régiment de decouverte included two squadrons of Panhard AMD 35 armored cars and three squadrons of Renault AMR 35 reconnaissance tanks.

Besides the cavalry divisions, the French cavalry branch also included a variety of smaller formations supporting the other combat arms. The most significant of these were the reconnaissance groups attached to the infantry divisions (GRDI: groupe de reconnaissance de division d'infanterie). Five of these GRDI were mechanized for attachment to the motorized infantry divisions (DIM: division d'infanterie motorisée). These mechanized GRDI included a squadron of 16 Panhard AMD 35 armored cars and a squadron of 20 AMR light reconnaissance tanks.

FRENCH TANKS IN THE 1940 CAMPAIGN

Technical Assessment: The Turret Problem

In general, French tanks were technically well suited to their intended tactical doctrines, but with a number of clear exceptions. On the whole, French tanks were far better protected than German tanks, and their armament was more often capable of defeating German tank armor than vice versa. Nevertheless, there were some glaring technical problems.

The single most crucial fault in French tanks in 1940 was the Atelier de Puteaux (APX) turret designs. These designs were a continuation of the World War I practice of having a single crewman in the turret. While this might have been acceptable for the slow pace of tank combat in 1918, it was woefully ill-advised by 1940. The French tank crews dubbed this feature the “one-man orchestra” (homme orchestre), since the tank commander had to load, aim, and fire the gun while at the same time attempting to direct his tank within its section and keep an eye out for the enemy. As one cavalry tank section commander noted in his memoirs, once the shooting began, he could no longer exercise control over his section, and had a hard time simply tending to his own tank. German accounts of the 1940 campaign almost invariably remark at how slow the French tanks reacted in a mobile battle, as well as the preference of French tank units to fight from static positions. French tank units seemed leaderless, since section commanders had to attempt to deal with too many tasks on their own.

The single-man turret dominated French 1940 tank designs as much by inertia as by intent. The Char D1, not surprisingly, followed the one-man design since it was nothing more than a warmed-over Renault FT. The most unfortunate use of the one-man turret was in the Char B1 and Char B1 bis battle tanks. This was in large measure due to the archaic origins of the design, which was based on 1920 ideas about tank combat. The decision to remain with the one-man turret on the infantry tanks was understandable due to two major factors: size and cost limitations on the R35 design, and France’s “methodical battle” tactical doctrine. A one-man turret was more economical than a two-man turret, since a larger turret would have implied a larger and more expensive tank. This did not seem necessary in the infantry support role since French tactical doctrine was “top-down,” with the expectation that tank companies would be given clear instructions about their missions from the higher chain of command and then

carry them out in a slow and methodical fashion. The French “methodical battle” doctrine differed from German doctrine, which favored a measure of initiative by the local commander because of the chaos and unpredictability of the modern battlefield. It should also be recalled that a third of the German tanks of 1940, the PzKpfw I, also used one-man turrets.

The final production series of the Hotchkiss was fitted with an unditching tail. This Hotchkiss, probably from the 3e Cuirassiers, was knocked out near Mareuil-Caubert south of the Somme during the battle for Abbeville in June 1940. (NARA)

The French government dispatched a significant amount of industrial information to the United States in 1940 as part of a plan to begin licensed production of French tanks. Although the armistice ended these plans, French technical documentation proved instrumental in the rapid birth of the American tank industry in 1940 and 1941, particularly the use of large armored castings. This Somua S35 preserved at the time at Aberdeen Proving Ground is displayed next to the contemporary M2A1 medium tank of 1940. Subsequent US medium tank designs shifted to cast turrets, inspired by the French example. (Author)

The exception to the one-man turret should have been the cavalry tanks. French cavalry doctrine anticipated a mobile battle, and many early French armored cars had two-man turrets. The Panhard AMD 35 had a two-man turret. The turret problem crept in at the back door. When Gamelin forced the Hotchkiss H35 on the cavalry due to the delays with the Somua S35, the cavalry became saddled with the infantry's troublesome tank configuration. The Somua S35 is often described as having a one-man turret, but this is due to a misconception that it shared a common turret with the Char B1 bis. This was not the case, as the Somua's APX 1CE turret was specifically designed for a so-called "one-and-half-man configuration," meaning that the loading functions were handled by a second crewman. The Somua was limited from having a true two-man configuration largely due to the specifications, which placed too low a limit on overall weight while setting too high an objective for its armor. To conserve on weight, the tank was unusually narrow for its size, and narrow width impeded the use of a larger turret ring.

F

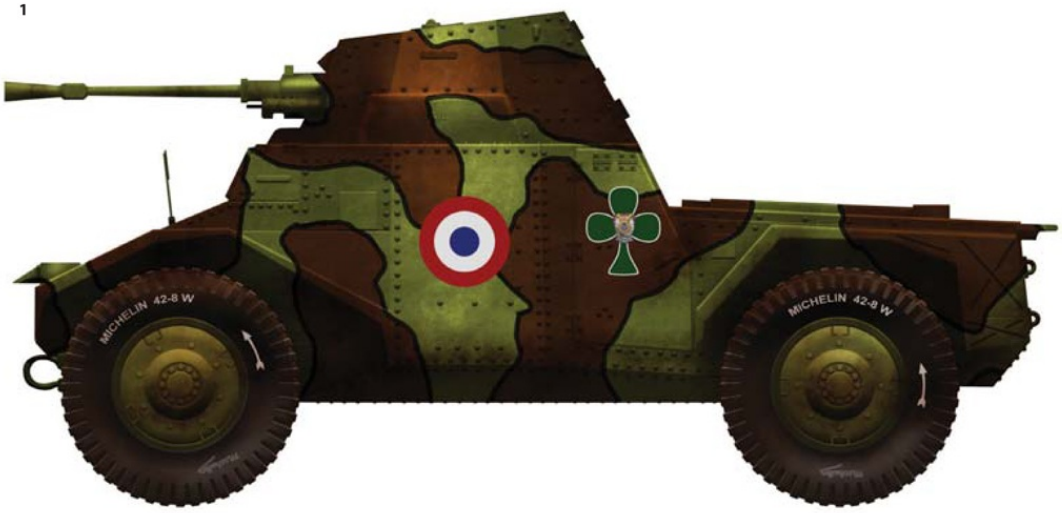
1: PANHARD AMD 35, 4e PELETON, 3e ESCADRON AMD, 8e REGIMENT DES CUIRASSIERS, 2e DLM, BELGIUM 1940

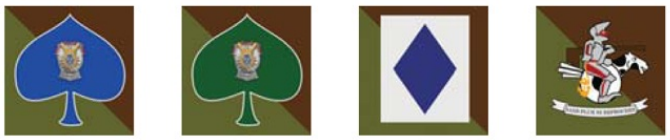
The early Pan-Pans delivered in 1937 like this one usually received the standard army green/earth brown camouflage scheme, separated by a sprayed edge in black. The white detail on the wheel was from a prewar parade and was probably worn off by the time of the fighting. The regiment used the traditional playing card symbols with the regimental crest in the center. The 1er Peleton AMD had the symbols in blue and the 3e Escadron AMD in green. Within the squadron, 1er Peleton used the spade, 2e the heart, 3e the diamond and 4e the club. The national cocarde was carried on the hull side, turret rear and turret top. The Pan-Pans usually carried a name in capital letters on the glacis plate, the 4e Peleton, 1/8e RC named “L’Epervier,” “Le Vautour,” “Le Condon,” and “L’Aigle.”

2: PANHARD AMD 35, 3e PELETON, 2e GRDI, 9e DIVISION D’INFANTERIE MOTORISÉE, BELGIUM, MAY 1940

The later production batches of Pan-Pans were usually finished in the standard scheme of army green and earth brown. Many of the Pan-Pans of this squadron had a cartoon of a charging knight painted on the side, his lance depicted as a stylized 25mm gun. The motto below was “sans peur ni reproches” (without fear or reproach). The national cocarde insignia was usually carried on the turret rear. This squadron had distinctive two-color diamond markings for each peleton (platoon) carried on the right front fender, based on the usual blue cavalry diamond, and shown in detail here. On the left front fender was the usual cavalry marking, a blue diamond in white rectangle, repeated on the right rear fender. The commander, Capt de Villiers-Terrage, had the Panhard marked number 1. The 1er Peleton was numbered 2 to 4, 2e Peleton was 5–7, 3e Peleton was 8–10, 4e was 11–13, and 14–16 were assigned to a special flying column attached to the corps. The Pan-Pans of the 3e Peleton were all given cat names based on the group’s feline emblem: “Le Chat-Huant” (8), “Le Chat-Pard” (9), and “Le Chat-Tigre” (10). This Pan-Pan, commanded by Aspirant de Mierry, was the one used by Gén Henri Giraud during the attempt to escape encirclement on May 16–17 during the Oise campaign against three German Panzer divisions.

1





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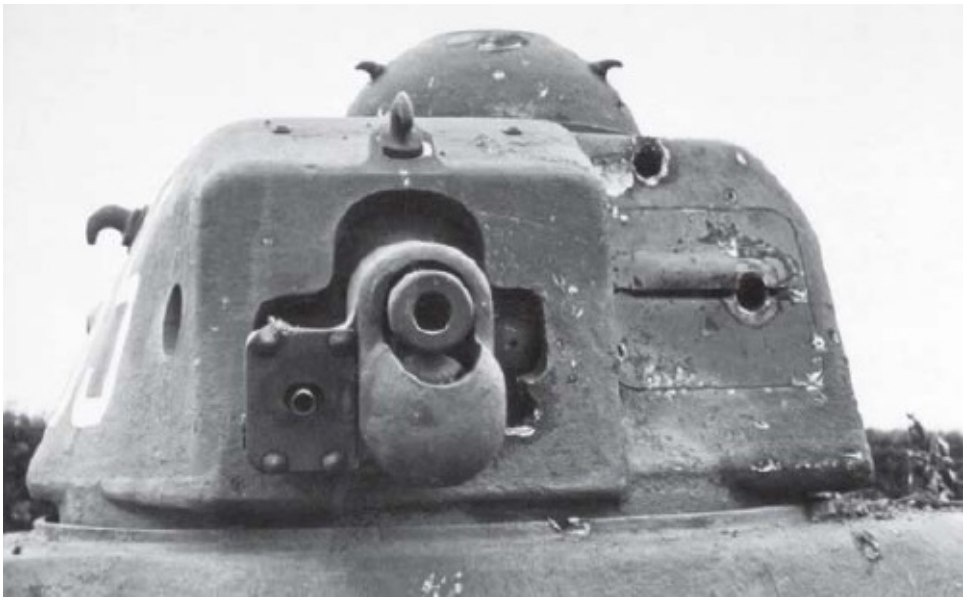

The cast armor of the Hotchkiss H39 was very effective in protecting the tank against German weapons up to the 37mm gun. This H39 from the 3e DLM was knocked out during the tank melee at Hannut on May 13, 1940 by two hits from PzKpfw IV tanks. There are numerous gouges in the armor from hits by 7.92mm and 20mm fire from the PzKpfw I and Pzkpfw II tanks that did not penetrate. (NARA)

Comparative Technical Data: French Tank Guns

Caliber (mm)	25mm	37mm	37mm	47mm
Model	SA35	SA18	SA38	SA35
Length (calibers)	L/72	L/21	L/56	L/32
Cartridge	25x194R	37x94R	37x149R	47x193R
AP projectile	Mle. 1934	Mle. 1937	Mle. 1938 (APC)*	Mle 1932 (APC)
AP projectile weight: kg (lb)	0.9 (2)	0.39 (0.85)	0.7 (1.5)	1.6 (3.5)
Initial muzzle velocity: m/s (ft/s)	918 (3,010)	600 (1,965)	705 (2,310)	680 (2,230)
Armor penetration: mm @30° @400m	40	18	30	40
* APC: armor piercing, capped				

Technical Assessment: The Radio Gap

Besides the one-man-turret problem, French tank units suffered from poorer battlefield coordination than German units. One reason was the disparity in radio use. German units tended to issue radio receivers to all tanks, and radio

transmitter-receivers to section leaders' tanks. French cavalry tanks followed a similar pattern on paper, though in practice radio distribution was not as complete. Once again, Gamelin's decision to issue the H35 to the cavalry had deleterious effects, since the tank was too small to comfortably fit a radio anywhere either crew member could actually operate it. French infantry light tanks had no radios in tank units except for a few experimental units; all the battle tanks had a transceiver. A program was under way to add radios to the infantry light tanks in 1939, but this had limited results by May 1940. The French problems with radio distribution were based on both cost and quality issues. The French rearmament program of 1936–40 took place amidst the lingering effects of the Great Depression, and to some extent radio production was a casualty of the budget. However, it also had to do with the technical problems of radio use in tanks. Early tank radios relied on telegraphic transmission, not voice transmission, and so required a crewman conversant in Morse code. There was a widespread shortage of radio operators with these skills due to French reliance on reservists. French military radios had a bad reputation for durability in battlefield conditions. This was in part due to the technical limitations of military radios of the period, and perennial problems such as the difficulties of operating AM radios from within tanks. It is by no means clear that German radios, though more numerous, were particularly effective in 1940, and this entire issue warrants more detailed study.

Legends of the Campaign

One of the most prevalent legends of the 1940 campaign was that French tanks were foolishly broken up into "penny-packets" compared to the concentration of the German tanks in the Panzer divisions and Panzer corps. During the Battle of France in 1940, 44 percent of French tanks were in the armored and mechanized divisions (DCR and DLM) and 66 percent were in separate infantry and cavalry tank units. In contrast, virtually all of the German tanks were in the 10 Panzer divisions. It is unclear why the French should have concentrated all of their armor in mechanized divisions. Unlike Nazi Germany, France's strategy was not offensively oriented. The French defeat had little to do with armored doctrine, but was caused primarily by the operational failure to anticipate and respond to Germany's encirclement maneuver through the Ardennes. French tank units, especially the cavalry's DLM, fought extremely well at the tactical level, but these actions could not overcome the profound shortcomings of the Allied high commands.

A line-up of recently completed Hotchkiss H39 at the Hotchkiss plant at St Denis in the outskirts of Paris in the early summer of 1940. The final production series was armed with the new 37mm SA38 gun. Most of these late deliveries went to improvised formations hastily created in the final days of the Battle of France. (APGOM)

The Panhard AMD 35 was the only French AFV of the 1940 period deemed modern enough to resume production after the war. A total of 414 were manufactured, with most being sent overseas for colonial duty in North Africa and Indochina. The postwar Panhard 178B had the new cylindrical Fives-Lille FL1 turret, spare wheel stowage on the hull side, and a new engine. (Patton Museum)

From a broader historical perspective, the unusual concentration of German tanks in the Battle of France in 1940 was an aberration, albeit one that was highly successful in view of the risky German 1940 operational plan. As combined-arms tactics matured, the tank deployment patterns between 1943 and 1945 were closer to that of the French army of 1940 than the Wehrmacht of 1940. The British, Soviet and American armies of 1944–45 all devoted a large fraction of their armored forces to the support of the infantry divisions, while retaining only a portion for their armored divisions. For example, by the end of the war in Europe in May 1945, the Soviet Army had 56 percent of its tanks and assault guns in the tank and mechanized corps, and 44 percent in separate regiments and brigades supporting the infantry and cavalry. The US Army was similar, with 44 percent of its tanks and assault guns in the armored divisions, and 56 percent in the separate tank and tank destroyer battalions supporting the infantry divisions. The German army also changed its deployment patterns after 1940, gradually expanding its assault gun (Sturmgeschütz) and tank destroyer (Panzerjäger) units, so that by the final year of the war about a quarter to a third of its armor force was used to support the German infantry divisions. In Normandy in 1944, the Wehrmacht had 72 percent of its armored force in the Panzer divisions, and 28 percent in separate assault gun and tank destroyer regiments and battalions.

Another legend of the 1940 campaign has been that the French army was numerically superior in tanks to the German army. While this may have been literally true, it obscures several important issues. If the obsolete Renault FT tanks are dropped from the French totals, then the tank inventories on both sides in 1940 turn out to have been nearly equivalent. While all of the German tank force was concentrated in the attack zone in Belgium and the Ardennes, the French army had several of its field armies in Lorraine, Alsace, and the Italian frontier. In total, about 885 tanks or over a quarter of its tank force was deployed away from the main battle zone. Many of these tanks were obsolete Renault FTs, but 585 were modern R35 infantry tanks. As a result, the Wehrmacht enjoyed numerical superiority in the main battle zone. If hastily formed and partially trained units such as de Gaulle’s 4e DCR are omitted from the totals due to their late arrival, then German numerical superiority becomes even clearer.

Tank Strength, May 1940

	Germany	France (w/o FT)	France (inc. FT)
Available	3,465	3,796	4,428
Deployed	2,659	2,713	3,193

The number of French tanks manufactured through June 1940 was not equivalent to the actual number of tank units that the French were able to deploy in 1940. The German army won the tank arms race of the 1930s. The German army started large-scale tank production a year earlier than the French, and were able to maintain this lead until the start of the war in September 1939. It was not simply the numerical advantage this entailed, but rather the earlier opportunities for raising and training the new tank formations.

French tank production only began to catch up to German tank production late in 1939. Furthermore, some of the statistics obscure the real state of affairs. The French government charted the date of tank deliveries when army inspectors accepted the chassis from the tank plants. These dates in fact represented the fulfillment of the companies' contracts, not actual delivery to army units. What is not widely appreciated was that these tanks in many cases were still incomplete. Often the tanks were delivered without turrets or armament, which were provided by government arsenals. To give some specific examples, Somua delivered 300 S35 tanks by September 1939. However, only 246 had actually been received by the army in a complete state with turrets and armament, of which 191 were deployed in units, 51 were in depots awaiting assignment, and 4 were being repaired prior to issue. While the increase of French tank production in late 1939–early 1940 was no doubt a remarkable industrial achievement, it obscures the fact that the late surge of tanks could not be absorbed into the army due to the lack of trained units. The French army did not mobilize its 43 infantry tank battalions until August–November 1939, and in many cases these battalions did not receive their intended tanks until 1940, training on obsolete and completely dissimilar FT tanks instead. France had only two mechanized divisions in service in September 1939 at a time when the Wehrmacht was already fighting with 10 Panzer and mechanized divisions in Poland.

Obsolete Renault FT tanks in the Levant were formed into four CACL (compagnie autonome des chars du Levant) stationed in Bierut, Aleppo, Damascus and the Estabel air base. Each had one of these Renault Char Canon de 75S assault guns, fitted with a fixed casemate and a short 75mm BS howitzer. (Patton Museum)

The 1930s Arms Race: Cumulative Tank Production 1931–40

	1931	1932	1933	1934	1935	1936	1937	1938	to 9/39	1939	1940
Germany				54	905	1,794	1,851	2,663	2,764	3,025	3,679
France	15	142	172	238	379	997	1,584	2,111	2,667	3,261	4,222

The 1930s Arms Race: Tank and Mechanized Divisions

	1935	1936	1937	1938	1939	1940
France	1	2	2	2	2	6
Germany	3	3	4	6	10	10

In reading French tank unit histories of the 1940 campaign, a central problem facing the combat deployment of these units was the mechanical breakdown of their tanks and loss of tanks due to fuel exhaustion. For readers familiar with German tank history, these problems were an echo of the German experience during the Anchluss with Austria in March 1938, when their Panzer columns

broke down with alarming frequency during their uncontested drive to Vienna. The key difference was a critical two-year lead that enabled the Wehrmacht to take advantage of the earlier formation of its Panzer divisions and to incorporate the lessons from the Austrian Anschluss in 1938, the occupation of the Sudetenland and the Czech lands in 1938–39, and the invasion of Poland in 1939. In 1940, the Panzer divisions were experienced and had overcome many of the ordinary mechanical and training issues that plagued the French in 1940. The French army had no such opportunities and went into the 1940 campaign undertrained and unprepared. Napoleon's aphorism "the human is to the material as three is to one" certainly applied to the 1940 campaign.

A captured French R35 is repaired by Australian troops of the 7th Division Recovery Section near Tyre following the summer fighting in the Levant. This tank originally served with the 63e BCC prior to the tanks being assigned to the 6e RCA after the armistice. (Australian War Memorial)

French Tank Deployment, May 1940

Unit	FT	R-35	H-35/-39	FCM-36	D2	B1 bis	AMR	S-35	Total
1e DCr			90			69			159
2e DCr			90			69			159
3e DCr			90			62			152
4e DCr		135	35		45	33		35	283
1e Armée*		90	90						180
2e Armée*		45		90					135
3e Armée*	120	180							300
4e Armée*	60	90							150
5e Armée*	60	135							195
7e Armée*		90							90
8e Armée*	120	90							210
9e Armée*	60	90							150
Armée des Alpes*	60								60
Infantry Sub-total	**480**	**945**	**90+305**	**90**	**45**	**233**		**35**	**2,223**
1e DLM			94				56	96	246
2e DLM			94				58	96	248
3e DLM			23+140					80	243
1e–5e DLC			48+32				115		195
1e–7e GRDI			0+30				8		38
Cavalry sub-total			**259+202**				**237**	**272**	**970**
Tanks deployed	480	945	349+507	90	45	233	237	307	3,193
Tanks manufactured	632**	1,568	400+557	100	87	347	320	417	4,428

*Infantry tank battalions attached to the field army

**FT tanks available for service, others retired to depots

FRENCH TANKS AFTER THE 1940 ARMISTICE

It is often forgotten that after the 1940 defeat, a rump French army remained after the armistice. The Germans allowed a lightly equipped army of eight divisions to remain in the unoccupied region of France controlled from Vichy. This force had no tanks, but the eight cavalry regiments were each allowed two platoons of armored cars for a total of 64 AMD 35 armored cars. These armistice Pan-Pans had their 25mm guns removed and were armed only with machine guns.

The AMD White-Laffly 50AM was a modernization of the World War I White TBC armored car on a new truck chassis between 1931 and 1933. Many of these were sent off to the colonies, and this one from the 2e RCA was knocked out during a skirmish with the 26th Infantry, 1st Division near El Ancor on the morning of November 8, 1942 shortly after the Operation Torch landings near Oran. It is being inspected by an American war correspondent. (NARA)

The most substantial French tank force remained in the overseas colonies in North Africa, the Levant (contemporary Syria and Lebanon), and Indochina. France had deployed a number of Renault FT tank battalions to the colonies in the early 1920s, and some had seen combat during colonial disturbances such as the Rif War. At the start of the war in September 1939, there were 163 Renault FTs operational overseas, including 41 with the 7.5mm machine gun, 89 with the

37mm gun and 33 with the 75mm BS howitzer. Of these, 105 were in North Africa, and the remainder in the Levant and Indochina. Many of these had been retired from the tank battalions but were retained at company strength for guard duties at airfields and other locations. Besides the operational Renault FT, there were large stockpiles stored in depots, with some 363 Renault FT of various types on hand in the colonies in 1941, of which about 250 were in North Africa.

G

1: RENAULT R35, 6e RÉGIMENT DES CHASSEURS AFRICAINES, LEVANT, JUNE 1941

The 63e BCC was mobilized on May 15, 1939 south of Beirut in the Levant, and received its first shipment of 15 R35 tanks from the 1939 production batch with some typical matricules being 50805 and 50880. A subsequent batch of 23 tanks from the early 1940 production batch was later shipped to the Levant to complete the battalion's strength, and the matricule on this tank was 51324. The battalion was nominally disbanded after the 1940 armistice, though the tanks remained. In January 1941, the 6e RCA was formed with four squadrons, each with 23–24 vehicles. The 1e and 3e escadrons were equipped with armored cars from the 8e GAM, while the 2e and 4e escadrons received the R35 tanks from the former 63e BCC. This regiment saw extensive fighting against Commonwealth forces during Operation *Exporter*, mainly facing the Australians. Most of the unit's tanks had few markings, but this unit, presumably the 2e Escadron, used the usual playing card symbols and a single digit tactical number. The French cocarde was carried on the rear turret corners. The color scheme is the usual 1940 pattern of army green and earth brown.

2: AMC WHITE TBC, 7e RÉGIMENT DES CHASSEURS AFRICAINES, LEVANT, JUNE 1941

The French army deployed the 6e Groupe d'Autocannons et Automitrailleues to Beirut in January 1920, equipped with White armored cars that had been modestly modernized with more modern wheels. These armored cars saw combat against Emir Faisal and in the fighting in Cilicia in 1920–21, and in later fighting through the mid-1920s in other regions of Syria. After several reorganizations in the late 1920s, the core of the French armored car force in the Levant became the 8e Groupe d'Automitrailleuses (GAM) on March 1, 1933 with its three squadrons stationed in Damascus, Beirut and Aleppo. In the wake of the 1940 armistice, there was further reorganization, but eventually the White armored cars were assigned to the newly formed 6e and 7e RCA, forming two squadrons in each regiment. This particular White TBC was knocked out on the road to Damascus in late June 1940. It is finished in the usual army green. The vehicle was named "Vendredi 13" (Friday the 13th) and carries the matricule 36. The vehicle tactical number is a white 14 on the upper left edge of the turret face. It carries a blue club in the style of the former 8e GAM, and in all likelihood the markings are remnants of the original markings of the armored car group.

1

2

From enemy to ally. A Hotchkiss H39 and Renault R35 of the 1e RCA on parade in Rabat on December 19, 1942 as they pass a viewing stand including Gen George Patton and the French commander, Gén Charles Noguès. The Renaults had previously belonged to the 62e BCC prior to their amalgamation into the 1e RCA after the 1940 armistice. (NARA)

In September 1939, the largest concentration of colonial tanks was in Tunisia, with three battalions of 135 D1 light tanks (61e, 66e, 67e BCC). These three battalions were moved towards the Mareth Line to defend the colony against possible Italian action from Libya. They were directed under a new command, the GBCFT (groupement de bataillons de chars des front tunisiéns), which was reorganized as the GBC 521 (groupe de bataillons de chars) in January 1940. One of these units, the 67e BCC, was sent back to France in the summer of 1940 to participate in the Battle of France, leaving two battalions.

Morocco had two Renault FT battalions, the 62e BCC near Mèknes and Fez and the 66e BCC near Casablanca and Marrakech, both under the direction of GBC 522. The most modern force overseas was in the Levant. The 63e BCC was stationed south of Beirut and was first equipped with Renault FT tanks, and later with 39 R35 light tanks. A second unit, the 68e BCC, was formed in November 1939 when a ship carrying a battalion of new R35 tanks for Poland was diverted after the September 1939 defeat. This newly formed battalion was stationed in Homs, and both battalions were directed by the GBC 523.

The cavalry had a substantial presence in the colonies, most notably in North

Africa with the regiments des chasseurs d'Afrique (RCA). At the start of the war, there were only 28 cavalry tanks overseas. The 1er RCA had 16 H35 tanks in September 1939, reinforced by 16 new H39s that arrived in southern Tunisia in mid-February 1940. The other cavalry tank long associated with the colonies was the Renault AMC 34, also with the 1er RCA. All 12 of these were shipped to Tunisia in 1937. The bulk of the cavalry armored force in the colonies consisted of armored cars, many of them types that were developed specifically for colonial use. None of the new Panhard AMD 35s were deployed in the colonies.

Cavalry AMD in Colonies, September 1939

	Total	Overseas
Schneider-Kégresse P 16	96	14
Laffly-White 50 AM	98	49
Laffly-Vincennes 80 AM	28	27
Panhard 165/175 TOE	38	36
White TBC	86	57
Berliet VUDB	39	39
Laffly S.15 TOE	27	27
Total	412	249

Shortly after the 1940 armistice, the Royal Navy attacked the French fleet in the port at Mers-el-Kebir on the Algerian coast on July 3, 1940 to prevent the warships from falling into German hands. This infuriated the French and changed the German attitude towards French colonial forces, since Vichy France now had a reason to defend the colonies against future British operations. Besides allowing the French army to retain tanks in the colonies, the Germans also permitted some modest transfers of modern tanks from France to the colonies. The most notable example was the 12e GACA (groupe autonome de chasseurs d'Afrique), which included 23 Somua S35 tanks, and was sent to Tunisia in 1941.

Operation *Exporter*

Although these small numbers of tanks might seem like an obscure footnote to French tank history, in fact many of these tanks saw combat in 1941–42 under difficult circumstances. The first large-scale use of French tanks since 1940 took place in the summer of 1941, when British and Commonwealth forces launched Operation *Exporter* from Palestine to take control of the French Levant. The 95

Renault R35 tanks in the two battalions in the Levant had been absorbed into the 6e and 7e RCA prior to the fighting. Besides these tanks, there were some older Renault FT tanks and about 90 armored cars, mainly old White TBCs, but also locally improvised types such as the Tanaké armored trucks. The French tanks were widely used in combat during the June–July fighting, and the R35 tanks of the 7e RCA played a pivotal role in overrunning the 1st Royal Fusiliers at Kuneitra on June 16, 1941.

A specialized version of the Panhard AMD 35 entered production in May 1940 for use in North Africa, with an improved radiator. A handful of these were pressed into combat in the final days of the Battle of France, and this is a rare photo of one knocked out near Bussy-le-Repos to the southeast of Paris on June 14, 1940. This AMD 35 AFN variant can be identified by its registration number, which identifies it as the first of eight vehicles delivered from the second contract batch. (NARA)

The Somua S35 cavalry tank in the foreground belonged to the 12e Regiment des Chasseurs d'Afrique, one of the French colonial units that joined the Allies after the *Torch* invasion. Squadrons from this unit saw fighting against the Germans in Tunisia in the spring of 1943, and are seen here at a victory parade in Tunis in June 1943, with a French cavalry unit passing in review. This regiment was re-equipped with Sherman tanks and fought in France in 1944 as part of the French 2nd Armored Division. (NARA)

Operation *Torch*

The French tank force in North Africa had been substantially reorganized after the 1940 defeat. The two battalions of Char D1 in Tunisia were reassigned to the 2e, 4e and 5e RCA. In Morocco, most of the modern tanks including the H35, H39 and R35 were assigned to the 1e RCA. The Allied amphibious landings on November 8, 1942 consisted of three task forces landing on the Moroccan and Algerian coast. There were a number of sharp tank clashes over the next few days between French and American tank units. The US Army's Central Task Force landings near Arzew on the Algerian coast on November 8 ran into resistance from some White TBC armored cars of the 2e RCA that were knocked out by 37mm antitank guns near El Ancor. During the advance from the

beachhead on November 9, a M3 light tank company of 1/1st Armored, 1st Armored Division was engaged by the D1 tanks of the GEC (groupe d'escadrons des chars) of the 2e RCA from the Tafaraoui/La Senia airbase, but the French force lost 14 tanks for the loss of a single American light tank.

The Western Task Force landing on the Moroccan coast also had a number of tank encounters. On November 9, R35 tanks of the 2e Groupe Mixtes, 1er RCA clashed with a group of seven M5 light tanks of the 1/66th Armored, 2nd Armored Division outside Port Lyautey on the Moroccan coast, and four Renaults were knocked out. The clashes became less common over the next few days as a settlement was reached. The Vichy French forces eventually switched sides and joined de Gaulle's Free French forces. Several of the tank units, including some D1 and S35 companies, later fought alongside the Allied forces in the Tunisia campaign in February and March 1943. The creation of the Free French tank force is outside the scope of this book.

Tank Development in Vichy France

Curiously enough, tank development continued in France even after the armistice. The Somua S35 was the only French tank that interested the German army, and there was a tentative scheme in late 1940 to use captured French equipment to build new Panzer divisions. There was a deliberate effort to recover as many S35 as possible, and these were transferred to the St Ouen plant for refurbishment. There is also some evidence that unfinished S35 were completed under German supervision. Somua engineers continued to work on the proposed S40 cavalry tank. The Vichy government under Admiral Darlan conducted discussions with Berlin via Otto Abetz, the German ambassador, in the spring of 1941 in the hopes of loosening German occupation policy in exchange for German military rights in the French overseas colonies. A tentative set of agreements was reached in May 1941, called the Protocols of Paris.

Among these discussions was a scheme to initiate production of an improved version of the S40 tank with a new welded turret developed by FCM. The turret was in large measure based on the recognition that the previous types of French tanks with one-man turrets were inefficient in combat, and the new layout was clearly based on the German style of three-man turrets. A further incentive for initiating S40 production was an approach by the Japanese government in November 1940 to utilize dormant French industrial capacity to manufacture S40 tanks for the Imperial Japanese Army. The Protocols of Paris envisioned a production scheme to manufacture 800 improved S40 tanks, of which 200 would be earmarked for future French use in the colonies, and the remaining 600 tanks

for the German and Italian armies. In February 1942, the French and Japanese governments reached a tentative agreement on the production of 250 improved S40 tanks for the IJA, which would be supplied 12–18 months after a contract was signed.

There were hopes to start the manufacture of the improved S40 tank in 1942. This illustration shows the intended layout of the version, with three-man FCM turret and improved 47mm gun. (Author)

Following the Battle of France, Germany confiscated surviving French tanks and put them into Wehrmacht service. This is a Pzkpfw 39H 735(f) serving on antipartisan duty in Yugoslavia in 1943 with the Panzer-Kompanie, 7.SS-Freiwillengen-Gebirgsjäger-Division “Prinz Eugen,” with typical German modifications such as the modified commander’s cupola. (NARA)

The Protocols of Paris were never fully implemented, in no small measure due to Hitler’s strong distaste for any scheme that would allow France to rearm. Nevertheless, the French government continued a small-scale tank development effort in the hopes of winning Berlin’s acquiescence. The focus of the S40 program shifted from the Somua plant in occupied St Ouen to the FCM plant in unoccupied Marseilles. The Germans were kept informed of progress on the nouveaux char français (new french tank). FCM developed two alternative designs for the tank, a two-man turret armed with the existing 47mm SA35 gun, and a three-man turret with the more powerful 47mm SA37 gun. The program was openly discussed with the armistice commission and reviewed by the CIAF (Commission italienne d’armistice avec France: Italian Armistice Commission with France) in September 1942. At the time, the Vichy French government was proposing a reduced production scheme for the French army of 135 Somua tanks for three squadron groups in North Africa, plus the proposed Japanese order as

well as any tanks the Italians and Germans might wish to order. The program came to a crashing halt in November 1942 following the Operation *Torch* landings in North Africa, when the French army there quickly switched to the Allied side. The Wehrmacht occupied the remainder of France, disbanded the Vichy government, and disarmed the French armistice army.

FURTHER READING

As mentioned in the previous volume, the French magazine *Guerre, Blindés & Materiél* is indispensible for anyone interested in French tank development of the Third Republic. The bibliography here is shorter than in the first volume, since it omits many of the general histories already listed. The list here covers monographs oriented towards the French mechanized cavalry.

Barbanson, Eric, *Le 1re DLM au Combat*, Histoire & Collections (2011)
Danjou, Pascal, *Les Automitraillesuses Citroën Kegresse*, Trackstory No. 12 Barbotin (2010)
Danjou, Pascal, *Panhard 178*, Focus No. 6, Barbotin (2010)
Danjou, Pascal, *Panhard 178*, Trackstory No. 2, Barbotin (2004)
Danjou, Pascal, *Somua S35*, Focus No. 2, Barbotin (2008)
Danjou, Pascal, *Somua S35*, Trackstory No. 1, Barbotin (2003)
Danjou, Pascal, *Somua S35*, Trackstory No. 11, Barbotin (2010)
Mary, Jean-Yves, *Mai–juin 1940 – Les blindés français*, Heimdal (2012)
Sicard, Jacques, and Vauvillier, François, *Les Chasseurs d'Afrique, Histoire & Collections* (1999)
Vauvillier, François, *Les Automitrailleuses de Reconnaissance, Tome 1: L'AMR 33 Renault, Histoire & Collections* (2005)
Vauvillier, François, *Les Automitrailleuses de Reconnaissance, Tome 2: L'AMR 35 Renault, Histoire & Collections* (2005)

The French cavalry planned to consolidate the AMD and AMR vehicles into a new automitrailleuse puissante design and selected the futuristic Panhard AM 40P in May 1940. This illustration shows the configuration of the prototype, but other turret options were being studied. The program went into limbo following the 1940 defeat, but was revived after the war,

eventually emerging as the Panhard EBR in 1954. (Author)

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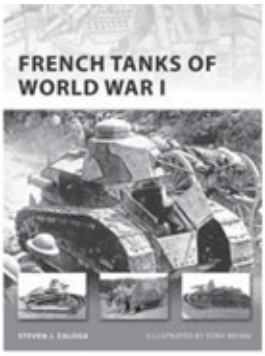

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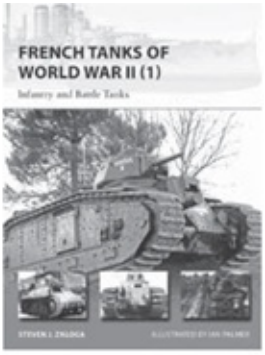

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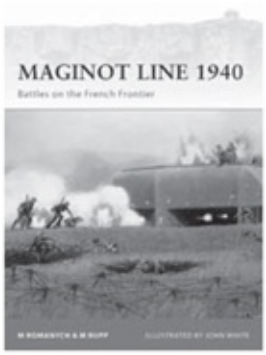

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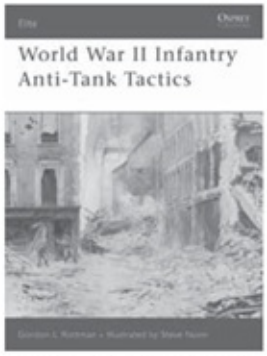

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GLOSSARY

AC	Auto canon (gun car)
AFV	Armored fighting vehicle
AMC	Automitrailleuse de combat (cavalry tank)
AMD	Automitrailleuse de découverte (deep reconnaissance armored car)
AMR	Automitrailleuse de reconnaissance (reconnaissance armored car)
APX	Ateliers de construction de Puteaux
APX-R	Turret designed by APX and cast at Atelier de Rueil (ARL)
BCC	Bataillon des chars de combat (tank battalion)
BCP	Bataillon des chasseurs portés (mechanized infantry battalion)
BDP	Bataillon de dragons portés (mechanized dragoon battalion)
CACC	Compagnie autonome des chars de combat (separate tank company)
CEMA	Commission d'Expérience du Matériel Automobile at Vincennes
DCr	Division cuirassée (armored division)
DIM	Division d'infanterie motorisée (motorized infantry division)
DLM	Division légère mécanique (light mechanized division)
DPM	Bataillon de dragons portés (mechanized dragoon battalion)

FCM	Forges et Chantier de la Méditerranée
GAM	Groupe d’automitrailleuses (armored car group)
GRDI	Groupe de reconnaissance de division d’infanterie (reconnaissance group of the infantry division)
Mle.	Abbreviation for “Modèle” (Model)
RAM	Régiment d’automitrailleuses (armored car regiment)
RCA	Régiment des chasseurs d’Afrique (African infantry regiment)
RDP	Régiment de dragons portés (mechanized dragoon regiment)
SA	Semiautomatique (tank gun)
Somua	Société d’Outillage Méchanique et d’Usinage d’Artillerie, St Ouen (a subsidiary of Schneider)
TBC VCLB	Voiture de commandement et de liaisons blindées (armored command and liaison vehicle)